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THE TWENTY-NINTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HOLLENDEN HOTEL, CLEVELAND, O.

Dear JOURNAL: The twenty-ninth meeting of the Western Gas Association will be its last one, "more's the pity," for it was agreed upon that the terms of merging with the American and the Ohio into a "great" gas institute should be accepted. A committee was appointed to wind up the affairs of the Association. There was some dissent, but the inevitable happened. Your correspondent is sorry that the act was accomplished, but one must bow to the will of the majority, and not thereafter sulk. We all can say, however, hail to the Western's record, for great good hath it done to the gas industry. So far as the meeting itself is concerned up to the present time, I can say that it has been a most interesting one—that is, up to the adjournment of the second day. Notable among the guests were Messrs. Wm. H. Bradley, Chief Engineer, Consolidated Gas Company, of New York, and Mr. George E. Woods, Engineer of Manufacture of the same Company, Mr. Charles F. Prichard, President of the American Gas Light Association, and Mr. Geo. G. Ramsdell, its Secretary.

President Doty called the meeting to order at the appointed time, in the presence of a fine attendance, in a meeting room that could not be surpassed, and under weather conditions that were all to the good. Mr. F. F. Prentiss, President of the Chamber of Commerce, welcomed the Association to the freedom of the city, and his speech was cleverly responded to by Mr. E. G. Pratt. Then the roll book was increased by the placing thereon of the names of 17 active and 9 new members. Some routine business followed, after which the President read the annual message, which was received with applause.

The first paper read was that by Mr. O. N. Guldlin, on the subject of "The Relation of Gas to Our Modern Life," and the comely, little lady's presentation was heartily received. The paper list was gone through rapidly and the one that attracted much attention was that by Mr. Frederic Bredel, on "Firing of Retort Benches by Battery Producers," which was read the morning of the second day. Mr. Van Rennselaer Lansingh delivered a very interesting lecture on "Engineering Illumination," illustrating it with 43 stereopticon slides, and on Wednesday evening Dr. W. H. Tolman delivered a lecture of varied character on the subject of "Industrial Betterment." The social arrangements as perfected by the local Committee of Arrangements (headed by Mr. M. S. Greenough as chairman) could not be bettered. The banquet was brought off in good shape, the man from New Orleans, the only "Tom." Miller directing the proceedings. I am afraid I will not be able to send you any more by wire in time for publication in the current issue. The meeting was an excellent one, and the great regret is that the Western is no more.—S.

BRIEFLY TOLD.

NOTES.—

THE Palestine (Tex.) Light, Heat and Power Company has been chartered with a capital stock of $400,000. The incorporators are Messrs. John H. Fitzgerald, P. W. Brown, Charles W. Lucas and E. Chandler Buck. Work is underway in the construction line.

LIBRARY OF CONGRESS MAY 21 1906

THE Niles (Mich.) Gas Light Company has been taken over by the Niles Gas Light Company. The incorporators of the latter are Messrs. Jas. T. Lynn, F. K. Pelton, R. T. Gray, A. L. Wilkinson and George G. Atkinson. It is capitalized in $150,000.

THE Suburban Gas and Electric Company, which controls the supply of gas and electricity to the towns of Revere and Winthrop, Mass., has petitioned the Board of Gas and Electric Light Commissioners for the right to issue $125,000 of additional capital stock.

THE Waterbury (Conn.) Gas Company is extending its supply in the adjoining district known as South Waterbury.

Use of Gas Lime on Young Grass.

The *Journal of Gas Lighting* says that in the Glasgow *Herald* for the 7th inst., in the column devoted to agriculture, and under the heading "Use of Gas Lime," the following statement was made by the Agricultural Correspondent of that paper:

An experienced agriculturist directs attention to the harm done in various parts of the country by the application of gas lime to young grass. The indiscriminate use of gas lime has been evident for a long time, despite all the warnings of the intelligent and the scoffings of the experts. At best gas lime is of little value, for it may be classed as genuinely stale "spent" material strongly charged with raw and impure sulphur. Why it should be in favor as a so-termed top-dressing is a mystery. It is of moderate use when harrowed at the fall of the year into the "shin" of fogged-up old pasture lands. But far more benefit, immediate and prospective, would be had, even on such areas, from an application of pure lime or lime compost. Of course, there are odd lots of gas lime which are not quite so bad in the poisoning sense. It does happen occasionally that the gas works laborer is a little free or extravagant with his fresh lime. As a rule, however, the fault is that the lime is not cleared out until it is supercharged with impurities. To apply such a blend to young grass or tender vegetation of any kind is to subject it to half burning, half poisoning. Some may hold that no perceptible harm results from a thin spreading. But where is the good? There ought to be some positive benefit even from application of a low priced material.

It is evident that if the author of this paragraph is an experienced agriculturist, he has derived very little profit from his experience. For instance, he has not learned that lime has the same action upon vegetation in all parts of the world, for he begins by saying that it has done harm "in various parts of the country." Then he has not learned that lime, as a fertilizer, is not intended for application to the foliage of plants, but to the roots. If lime is placed upon the leaves of a plant or the petals of a flower, its effect will be to destroy what it rests upon, and then, when it gets into the soil, to build up the plant into a healthier life. But so would any other form of manure. Would a gentleman who might have paid $7,500 for an orchid plant sprinkle the flower of it with any manure—powdered bone, superphosphate, slag or sulphate? The author speaks of the lime not being cleared out until it is supercharged with impurities. Did he ever put in a crop of any kind, or see one put in, because, for the purpose of fertilization, something which is very impure, and the more impure the better, is always applied at the root of the plant? A correspondent who has called our attention to this communication points out that it will do harm, because everyone will not take time to consider it in its true bearing, but will probably act up to it, and discard the use of gas lime.

No notice was taken of the matter till last month, when reference was made to it in the *Herald*. A correspondent, writing from well-known chemical works, said: "I can speak from my own knowledge, derived from 40 years' experience, that gas lime is not taken advantage of by farmers as it ought to be. Of course, care must be exercised in its application." He inclosed a copy of a printed letter sent to the manager of a large gas works, speaking highly of the use of gas lime at the fall of the year, and when applied as a compost made up with potato shaws. "It would be strange if those who are largely interested in the sale of gas lime were to condemn its use either in pure or in compost form. The fact that a certain communication from a lavish spreader of gas lime has been printed shows that the clearing out of the spent sulphur charged product is not quite so easy as it was in the last century. It has its own sphere of influence; but that sphere should not touch young grass in late spring." This statement is a slight improvement upon the first one; but it is only a halting recommendation of gas lime, and leaves much to be desired as a vindication of the article as a stimulator of vegetation.

[OFFICIAL REPORT—CONTINUED FROM PAGE 846.]

TWENTY-SECOND ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD IN CINCINNATI, O., MARCH 21, 22 AND 23, 1906.

SECOND DAY—MORNING SESSION.

The Association met pursuant to adjournment. After calling the meeting to order the President announced the first business would be

THE REPORT OF COMMITTEE ON HIGH PRESSURE DISTRIBUTION,

which was read by Mr. J. D. Shattuck, Chairman, as follows:

The past year has brought forth a number of interesting articles on gas compression and pressure distribution. A notable article by E. A. Rix, contributed to the Pacific Gas Association, and printed in the "Progressive Age" of September 15th, covers the subject of compression very thoroughly.

During December, 1905, and January, 1906, the "Gas World" of London has published a series of articles starting with the original low pressure formula and developing high pressure formulæ from the same. It is a very good review of the subject.

H. L. Rice contributed an interesting article before the American Gas Light Association, in October, reviewing the subject of high pressure distribution to date and enumerating the various plants using the same.

The three most important problems on high pressure distribution not satisfactorily solved as yet are; first, the best high pressure formula proved by sufficient number of tests; second, to eliminate electrolysis which is the most serious problem we are now confronting and the one that seems to be the farthest from solving; third, the satisfactory removal of condensation due to compression. The Committee believes that the removal of moisture depends upon the reduction in the speed of gas, after leaving the compressor and frictional contact with finely divided plates. The present appliances for removing moisture have been limited to expansion tanks containing diaphragms, but these have been inserted without reference to the velocity at which the gas is traveling. We believe that the tanks should be large enough in diameter to reduce the flow of gas to a low speed and containing frictional plates like a tar extractor of sufficient number to break the gas up in a good many fine streams.

The loss of candle power under some conditions has been found very great. In one instance, a loss of 7-candle power in 9 miles. This loss was due, however, to the introduction of a new oil which required considerable experience in the handling, before this trouble was partly eliminated.

We wish to call attention to two features of high pressure distribution that demand strengthening. While U-seals have been considered satisfactory in the past and are a very cheap form of seal, there is danger that they are filled with water or a poor quality of oil that will freeze, such instances having been discovered in spite of the most careful inspection, and it is recommended that some form of mercury seal be adopted, especially as new seals have been brought out which require very little mercury to work them. Another point is the fittings used between the service and the governor. These fittings should be much stronger and heavier than the usual stock fittings, and the pipe and nipples should be all very heavy pipe to give the necessary thickness of metal at the threads. This extra precaution would add very little to the cost of the installation, but will be a safeguard well worth the expenditure. It has been found on several trials that very little strength is required to snap some of the threads about a high pressure installation.

At the conclusion of the written report Mr. Shattuck said: In natural gas work the condensation of moisture following compression is removed by passing the gas through coolers made of pipe laid in a pond or basin of water. With such a device as this, and a drip at the end of the cooler farthest from the compressor, we have no difficulty in removing all the condensation resulting. All that is necessary is to cool the gas before it passes the drip to practically as low temperature as is likely in the mains.

Discussion.

The President—Gentlemen, you have heard the paper. It is a matter everybody has been asking questions about for the last 4 or 5 years, and I would now be very glad to hear a discussion of it. If anyone wishes to discuss the paper or to ask the Chairman of the Committee any further questions, now is the time and opportunity to do so. If

not, the Chair will, without any further motion, present to Mr. Shattuck the thanks of the Association for the preparation and submission of this most interesting report.

AN ANNOUNCEMENT.

The President—The Local Entertainment Committee through its Chairman, Mr. Kenan, has planned for the Association a trip to the East End works of the Cincinnati Gas and Electric Company. I believe the members of the Association will consider that as instructive as any session we could hold here. I am, therefore, going to get through with the whole day's proceedings as arranged for in the printed programme before we adjourn, so as to leave the greater part of the afternoon open to those who desire to avail themselves of this very kind invitation extended by Mr. Kenan. The arrangement is to leave the hotel at three o'clock. I will now call for the

REPORT OF THE COMMITTEE ON UNIFORMITY OF GAS METERS.

The report was then read by Mr. Paul Doty as follows:

Your Committee recommends that the Association should adopt as a standard differential pressure at which to measure the capacity of meters that of $\frac{3}{10}$ of an inch water column pressure; the manufacturer to arrange to supply the gas company with 5 standard size meters which would have a capacity at the previously mentioned differential pressure respectively as follows: 100 cubic feet, 150 cubic feet, 300 cubic feet, 500 cubic feet and 750 cubic feet.

We would also recommend that meters be designated by their cubic feet capacity at the standard differential of $\frac{3}{10}$ of an inch water column pressure and should be badged to show the capacity they will pass.

We recommend that no larger sizes be specified until further data is available from the attempt to manufacture meters which are rational in dimensions in all of their parts. Respectfully submitted,

CHAS. H. DICKEY,
PAUL DOTY,
H. C. ABELL,
} Committee.

Discussion.

The President—To the extent that this report may be taken as a guide by meter manufacturers, it is a most important matter and one that interests every member here. I would be very glad indeed to hear some discussion of this paper before the report of the Committee is submitted for adoption. I would like to ask Mr. Doty, as a member of the Committee, if he thinks it necessary to put in the 150 cubic foot size? Meters will naturally be known as Nos. 1, 2, 3, and so on, and if the No. 1 meter passed 100 cubic feet, the No. 2 meter passed 200 cubic feet, and the No. 3 meter passed 300 cubic feet, would it not be easier to remember and to keep track of numbers and sizes, and would not the 150-foot size interfere with that nomenclature which would require a No. 1½?

Mr. Low—I would offer a suggestion. I made some tests with meters and found that a variable quantity of gas will pass, according to its specific gravity, and wondered if it would not be well to add a statement with reference to specific gravity in endeavoring to secure a standard of uniformity for gas meters?

The President—I would like to ask Mr. Doty if the Committee had in view any particular gas in suggesting these various capacities?

Mr. Doty—No.

The President—Or was the test made with air?

Mr. Doty—No; it was made with gas under ordinary conditions, practically half water and half coal gas with perhaps a specific gravity of .55. We have to settle on a basis of differential pressure in order to determine what is the capacity of a gas meter, and we recommended 3-tenths of an inch differential as being fair to the gas companies and one that they should be willing to accept as the measure of capacity.

The President—That is the most important feature of the report.

Mr. Doty—Yes, that is so. As far as the size of 150 cubic feet meter is concerned, that would cover the ordinary residence consumer where water heater, gas range and lights were installed. That would be a very general meter. A 100 cubic foot capacity meter would be practically the smaller meter, and we may as well have it 100 cubic feet as to have it any other size for small capacities, because the demand would be measured principally by the service governor, if you are going to use a small quantity of gas, but the 150 cubic foot size will meet the ordinary residence conditions.

The President—I would suggest, if this report is adopted, it may become the basis of controversy between the gas companies and the meter manufacturers, and it would be well to specify the gas or the measuring fluid to be used in such tests; in other words, either water gas or coal gas or air. A meter manufacturer may sell a meter guaranteed up to this capacity and the gas company may test it with air and find that it will not pass that much gas.

Mr. Lloyd—Would it be in order to offer an amendment to this report?

The President—That is exactly what I was trying to bring out.

Mr. Lloyd—I do it simply for the purpose of bringing out discussion on this subject. My understanding is that meters are usually tested and proved with air. Certainly it is a testing medium of the greatest uniformity. With reference to any difficulty in numbering, which the President mentioned, that could be readily overcome by numbering in tens instead of units, thus making No. 10, No. 15, etc. I would, therefore, move an amendment "That the standard meter be tested with air."

Mr. Gardiner—Before that is put to a vote, I would like to ask what the relative passing capacity of air is?

The President—I understand it varies inversely as the square root of its density.

Mr. Gardiner—I understand it varies as the square root, but I cannot figure that out offhand.

The President—I do not say that I can. I know it doesn't vary very rapidly.

Mr. Gardiner—Suppose the meter passed 100 cubic feet of air, how much gas would it pass?

Mr. Clifford—It would pass about 120 cubic feet of gas, or about 20 per cent. more.

Mr. Gardiner—Assuming a difference of, say, 20 per cent., I was wondering whether it would not be better to standardize the capacity rating of gas meters on the amount of gas that would pass rather than on the amount of air they passed when tested with air. Of course, we could test with air and correct for gas. As gas is what we want to meter through, it seems to me that it might be best to designate the various sizes in terms of their several capacities for passing gas rather than air.

The President—I might call attention to the fact that everybody can get air, but some people can get coal gas and others can get water gas. Nobody, however, can get a mixture of exactly 5-tenths specific gravity, and in case of a lawsuit between the gas companies and the meter manufacturers, there should be a standard of uniformity that everybody could get at. There is one testing fluid which everybody can get, and that would be air.

Mr. Gardiner—Under the law referring to square root that has been stated, we could test and standardize our meters with air and then arrive at the variance between air and gas as has been suggested.

The President—Yes, and no jury on earth would have the least confidence in it.

Mr. Butterworth—What about the air at Denver, Col., for instance, which is very rare? (Laughter.)

The President—They would have to send down below and get a shipment of good air. (Renewed laughter.)

Mr. Gardiner—You can get the barometric pressure in your meter prover. The point I wanted to get at was, having in mind the size of the meter and the classification of the meter, then how much gas will that meter pass? The old method told us what the meter would not do. If we standardize these meters in sizes of so many cubic feet per hour on 5-tenths specific gravity, that would tell us how much gas the meter would pass within a very close range. If we would standardize it on the basis of 100 cubic feet of air, then we would know that we would have a margin of 20 per cent. plus or minus. I see the weight of the legal suggestion made by the Chair, but I wanted to see if we could not work out some closer formula.

Mr. Clifford—If you adopt a standard and a certain specific gravity for the gas, the meter manufacturers would undoubtedly take that standard, refer it to their engineers and by that means ascertain what that meter would test with air and would finally test it with air, so that you would get practically the same result.

Mr. Gardiner—My suggestion contemplated testing the meter with air and then a mathematical correction as to size and capacity for the use of gas in place of air.

Mr. Doty—On page 195 of the Question Box, question 499 reads: "How much more gas than air will a meter pass?" There are a variety of opinions expressed in the various answers submitted to that question. Prof. Magruder, who answered the question last, states: "The velocity of the flow of gas under the same conditions is inversely proportional to the square root of its density;" and he brings in the point which Mr. Butterworth makes as to temperature, altitude, etc.; so it seems to me that that is a very important question, and if we are going to recommend that the standard measuring fluid for meters be air, then we are

going to get from the meter manufacturers a great deal larger meter than is contemplated in the report. As a matter of calculation I should imagine that the 20 per cent. rule is erroneous.

The President—I would like to ask Mr. Doty if he does not think that the report of the Committee is in the proper shape to be received but not one to be adopted, because it is not specific enough, if it is going to be taken as guidance for contracts with meter manufacturers which might result in law suits? In other words, if the report is adopted in this shape and the meter manufacturers were asked to conform to it, it is not as specific as it should be.

Mr. Doty—The meter manufacturers, as I understand it, want to know what the gas men want. If the gas men will only say they will take three-tenths differential pressure, that is something of an advance. Then if they say they want the measuring fluid to be gas or air, that will also be something of an advance, then if they want to include the temperature, the altitude and the pressure conditions, that will be another step in advance. Now then, what do they want? As gas men we are willing to agree with Mr. Dickey on three-tenths differential pressure. We thought we could afford to sacrifice three-tenths of an inch differential pressure in the meter. It seems fair to us. Formerly, three tenths differential pressure was a severe tax, if we were carrying only one inch on our mains and getting seven-tenths at the burner. Now, pressures are higher on the mains and we can afford to sacrifice three-tenths of an inch differential. Later on, somebody will come along and say that we can sacrifice five-tenths; but we would not agree to that. We agreed to three-tenths. We would like to have the Association go farther if they will, and say what further conditions they are going to demand, and then the meter manufacturers will make a meter accordingly.

The President—It seems to me, as far as the report goes, it is all right, and the fact that it does not go quite far enough can be remedied in making contracts so that it may be specifically stated just under what conditions the tests are to be made.

Mr. Lloyd—Before that resolution is put to a vote, I would like to speak on the subject from the standpoint of a manufacturer. This meter question originally started, if I remember correctly, through the apparent lack of proper relative difference in price when stated in terms of capacity between a 5 and a 10-light meter, and also through the fact that the so-called 5 or 10 light meter of one manufacturer would not pass the same quantity of gas as that of another manufacturer, although the meters were the same price. Now, necessarily there is not a great difference between a 5-light and a 10-light meter when it comes to the question of cost. The labor involved in making a 5 is probably very nearly the same as that of a 10 and the difference in the cost of material cannot be great. The probabilities are that 5-light meters are sold at very much less margin of profit than 10 light meters, as in all lines of manufacture certain articles are always sold at a margin which is not particularly profitable; but this is made up by the average. Again, the meter manufacturers are equipped doubtless with automatic machinery for making the present standard sized meters, and in all these things, if there is any radical change, necessarily the purchaser must ultimately stand the cost. The nearer we would come to standardizing the existing sizes of meters manufactured, the less change and confusion it would make. Take any meter in use. It is not a matter of an arbitrary rule as to what that meter should pass in a given time, because suitability is determined by the maximum demand which may come upon it in its situation. It is only possible to approximate the duty which it must carry at any given time. I do not think, therefore, it is so important that we should have a specified capacity as that so far as possible all the different makes should be of uniform coupling dimensions and the capacity of the same sizes and should be uniform. At the present time I know we do not find any inconvenience in the existing capacities of 5 and 10-light meters, and, for small customers the 3-light meter, although we buy very few of them. If, therefore, we could use these existing sizes it would be better than turning the whole subject upside down simply for the purpose of establishing arbitrary test capacities.

The President—Have you not lost sight of the fact that given sizes are not the same with all manufacturers and unless there is one specified standard you cannot make them all alike? For instance, a 5-light meter in some instance is not a 5-light meter. It depends upon whom you buy it from. The meter manufacturers ask us to say how much gas shall a 5-light meter pass and what number shall they call it by. We cannot standardize one man's meter if it is not like the other man's.

Mr. Lloyd—That view of it may be taken, Mr. Chairman, but in that case we will necessarily have to pay the cost of that standardization. If the Association wants to do that it is certainly within its privilege to do it, but the nearer we keep to existing standards the less expense will be involved to the gas companies. If I may assume, for example, that a standard meter at the present time would pass 100 feet on a test, and we thought we could get along with a meter which would pass 75 feet, the difference in price would not be warranted by the difference in the capacity. I should like to see us keep as closely as possible to existing standards.

Mr. Clifford—I would like to ask Mr. Doty what present sizes the Committee had in mind to compare the new standard with? As has been suggested, the 5 and 10-light meters are not exactly the same as made by different manufacturers, but in so far as the connections are concerned, they will run practically the same. That is, a 5-light meter will have a ¾-inch connection, and so on. I think that would be a very important point to be suggested to the manufacturers to go with the capacity test, what are the present prevailing sizes which each new size should take the place of or compare with.

Mr. Doty—The present 5, 10, 30, 60 and 100-light meter. Nothing larger than a 100 light size as at present designated, and nothing smaller than a 5-light meter, as at present designated. I think there is a place for the 10-light meter between the 5-light and the 30-light meter, so-called.

Mr. Thwing—I would suggest, for the purposes of accuracy, that the time factor should be mentioned in rating the capacity of a meter. Reference has been made to the 100, the 150, the 300 and the 500, but in what time; 1 minute, 1 hour, 1 week or 1 month?

Mr. Butterworth—Mr. President, I move that the report be adopted so far as it goes, with the expression that it does not go far enough.

Mr. Lloyd—I think there was a resolution to amend the report before the house.

The President—As it was not seconded and was not submitted in writing, I do not believe there is a man in the house that can tell what it was. If you will submit the amendment in writing, of course, I will put the question of amending the report, but under the rules I cannot do it in this way. Will you state it again briefly, Mr. Lloyd?

Mr. Lloyd—Simply that air be used as the standard by which the test shall be made.

Mr. Stillson—I second the motion to amend.

The President—It has been moved and seconded to amend the report by providing that air shall be used as the standard by which the test shall be made. Is there any discussion?

Mr. Doty—If we are going to be accurate, let us be accurate. Mr. Thwing makes the point as to the rate of time. Of course, the report of the Committee refers to the rate per hour. If we are going to amend this report, let it cover all the apparent discrepancies or inaccuracies in the report. Let Mr. Lloyd embody in his amendment the rate per hour in the capacity of the meter, and also let him take up the question of the pressure of air, also the temperature which will affect the volume of air as well as the pressure, and then the Committe will be very glad indeed to receive all of these recommendations and will vote for the amendment, but we want to have everything expressed that should be expressed and not to take 15 or 20 bites of the same cherry. I will suggest that Mr. Lloyd write out these amendments so that they will be more explicit.

Mr. Lloyd—If the seconder of the motion will permit it, I would suggest the withdrawal of the original motion and substitute, "That it is the sense of this meeting that air should be used for the making of all tests, and that the details as to barometric pressure and time factor be referred back to the Committee."

The President—This is a matter of considerable mathematical intricacy, and to bring it up on the floor of a convention in the middle of a discussion, it is very difficult to arrive at any accurate conclusion.

Mr. Faben—I think we are getting away from the real point by drifting into all of these details. It would be a good deal like a man instructed to go out and buy potatoes, specifying the amount of starch they must contain. Whether the barometer stands at 29½ or 30 makes but little difference to us when we collect for the amount of gas consumed. We do not collect on that basis. So I do not think that all of these trimmings need to be put into this report. With reference to the question of air as the measuring fluid in determining the flow of a body through a meter, we could very easily wait for a low barometer or a high barometer in making the test just as we might elect. I think the main question is merely to establish the fact that when we buy a 5-light meter it must have a certain rated capacity, no matter who makes it or who uses it, and that the flow of pressure through that meter will not exceed a certain number of tenths. If we are going to sell gas, I do not know how important that word "air" is, because it is gas that we

are finally going to sell and not air. A gas company is not going to enter into any fine calculations when it makes out its bill. Our main object is to sell gas, so I do not regard it as vitally important whether the meter is tested with air or gas.

The President—I expect any meter manufacturer would agree to deliver meters that would conform to these specifications and we could put all of these details into our contract so that our rights would be preserved. The important matters of differential pressure and sizes are settled by this report, and I do not think the report will be taken as settling anything further than that. Did I understand you to say, Mr. Lloyd, that you desired to withdraw or change your amendment?

Mr. Lloyd—I offered a change at Mr. Doty's suggestion.

The President—Is there any amendment pending which you wish to have a vote upon.

Mr. Lloyd—Nothing beyond what has been previously stated. I suggested that the medium for testing meters be air, and that the minor details of differential pressure, barometer and time factor be referred back to the Committee for its consideration and determination.

The President—It has been moved and seconded that this report be amended so as to indicate that the medium to be used for testing meters shall be air. All those in favor of so amending the report will signify the same by saying aye and the contrary no.

After the *viva voce* vote has been taken, the President said: Gentlemen, the Chair is in doubt as to the vote and will therefore call for a rising vote. [The amendment was then adopted by a rising vote.]

The President—The Chair will now entertain a motion to adopt the report as amended.

On motion, duly seconded and carried, the report as amended was then adopted.

ADDITIONAL REPORT OF THE EXECUTIVE COMMITTEE ON HONORARY MEMBERS.

The Secretary—Mr. President, I desire to submit the following additional report of the Executive Committee on Honorary Members:

To the Ohio Gas Light Association: Gentlemen—The Executive Committee begs leave to offer the following recommendation, that Mr. Henry L. Doherty be elected to honorary membership in this Association.

It was then moved by Mr. Doty, and seconded by various members, that the supplemental report of the Executive Committee be adopted.

The President—I think before this motion is voted upon it is proper for the President of this Association to state that he has in his pocket a communication from Mr. Doherty absolving this Association entirely from any indebtedness which might otherwise be due to him on account of the money expended by him in a large amount of printing and other work which this Association has been carrying on for several years past.

Mr. McIlhenny—I think it might be well to say a few words on this subject. I think the recommendation of the Executive Committee is a most proper one. In fact it was in my mind to bring the subject up individually myself later on in the meeting. Mr. Doherty certainly has performed a prodigious amount of work for the Ohio Gas Light Association and has brought upon it a great deal of credit. Some of us have differed from Mr. Doherty as to some of the methods pursued, but they were all honest differences of opinion. We cannot but all respect his earnestness and his zeal for the Ohio Gas Light Association, and it is with a great deal of pleasnre that I second the motion. I think it is a proper and fitting tribute to one wno has done so much for the Ohio Gas Light Association. (Applause.)

The President—In addition to what Mr. McIlhenny has said, we know that Mr. Doherty, in the performance of his energetic work for the Ohio Gas Light Association, has drawn down upon him some adverse criticism from other quarters, and I think that we ought to make him feel that his "Home county sustains him." I am going to ask, therefore, that those who are in favor of the adoption of the recommendation of the Executive Committee electing Mr. Doherty an honorary member of this Association, will signify it by rising to their feet.

A rising vote then resulted in the unanimous adoption of the supplemental report of the Executive Committee electing Mr. Henry L. Doherty, of New York city, to honorary membership in the Ohio Gas Light Association.

The Secretary notified Mr. Doherty of the action of the Society in unanimously electing him as an honorary member and later received from him the following reply:

T. C. JONES, Secretary, Ohio Gas Light Association, Delaware, O.—Dear MR. JONES: Your letter of the 26th inst received. I want to express my appreciation of being elected an honorary member of the Ohio Gas Light Association. Very sincerely yours,

HENRY L. DOHERTY, Denver, Col.

The President—The next order of business is a paper by Mr. W B. Tuttle, of Long Branch, N. J., on the subject of the

READINESS-TO-SERVE METHOD OF SELLING GAS.

Mr. Tuttle read as follows:

The fact that certain classes of business are more valuable than others, even where the same amount of gas is sold in each case, is probably recognized by the management of every gas company at the present time.

The first indication that this fact was appreciated came when the gas stove was first put on the market on a commercial scale, and lower rates were made for the gas stove business than had been in vogue for lighting. The common and accepted argument for this practice was that during the day time practically no gas was consumed and that any additional business which could be taken on at that time required no increase in investment in mains, services or holders, and but a small increase in works capacity. At a later date the successful development of the gas and the application of gas to various industrial purposes, developed another and still lower rate, the argument being made that, while gas used for cooking might be in use 5 or 6 hours, gas supplied for power would be in use 10 or 12 hours.

In order to meet the conditions enumerated above, and also to meet conditions where it seemed desirable to give special quantity reductions to large consumers, various methods of regulating the charges for gas have been in vogue. These may be divided into three different groups, leaving out, of course, the old uniform rate which calls for the payment of a fixed sum per 1,000 regardless of the amount of gas consumed and the purpose for which it is consumed. These three methods are as follows:

1. The class rate. In this case the different prices which may be charged by the same company for gas will entirely depend upon the purpose for which the gas is used. Thus $1.50 may be charged for illuminating purposes, $1.25 for domestic fuel purposes and $1 for power or industrial purposes.

2. The discount or reduction on quantity rate. This method is subject to a great many variations, but the principle is that the greater the amount of gas consumed, the less the rate per 1,000 feet should be, without regard to the purpose for which the gas is used.

3. A mixture of the above two methods in which different rates are given for different classes of business and reductions are also made in the price per 1,000 as the quantity used increases.

Each of the above methods of charging is open to serious criticism. Any discrimination among consumers, based on the use to which gas is put, is sure to cause dissatisfaction and invite litigation. The injustice of such a rate may be illustrated by the following example:

Suppose we have a customer who burns gas in a store for 5 or 6 hours each night, and directly over him in the flat above we have a consumer who burns gas for domestic fuel purposes only and who possibly uses gas about the same number of hours each day. The storekeeper may use 4 times as much gas as the domestic consumer, and still he has to pay a higher rate per 1,000 for what he uses.

It may be argued here that the domestic consumer uses the gas in the day time when there is a small demand, and consequently that he should receive a lower rate, but as a matter of fact, during certain months of the year the storekeeper lights up his store before the householder gets through cooking dinner, so that the hours during which the two burn gas overlap, and this incident commonly occurs at the time of the year when there is the greatest demand on the gas plant.

In another instance, we may have a consumer using a gas engine and receiving his gas at a very low rate, while next door to him we may have another consumer using gas for cooking purposes at a higher rate. The party using the engine may only use the gas for 1 or 2 hours a day and use a much less quantity than the man using gas for domestic fuel next door, who uses the gas several hours a day, but the engine consumer may pay a lower rate for his gas.

By making a class discrimination the company may lower the price in many cases where the business is already unprofitable, and thus make it still more unprofitable. This has two effects. One is to reduce the net earnings of the company and the other is to put off the day when better rates can be made to profitable consumers.

For instance, there is not much question that a consumer who uses less than 1,000 cubic feet of gas per month is not a profitable consumer, and yet there are thousands of such consumers who get a low domestic fuel rate.

Besides this, the class rate system demands separate meters for light and fuel, and the cost of reading meters, handling accounts, collections, and interest on meters and connections is largely increased, so that a consumer who might be profitable when only 1 meter is used, may be unprofitable when 2 meters are in use.

When the quantity consumed regulates the price, the danger of dissatisfaction among consumers is not so great, as the public is accustomed to give and receive lower prices when goods are handled in large quantities. The company, however, may, under these conditions, give low rates to consumers who are not very profitable and refuse low rates to exceedingly profitable consumers, and, as a consequence lose, or fail to get, much valuable business.

As an example, we may have a proprietor of a hall, factory, or other similar building where gas for lighting is only used for an hour for 5 or 6 nights in a month, who gets gas at a lower rate than the industrial consumer next door, who uses perhaps half the amount of gas that is consumed in the first instance, but who uses it uniformly through the month taking it slowly, during 10 hours each day. Manifestly this latter consumer deserves a better figure than the large consumer who only uses gas for a few hours each month.

In the first instance, a very large meter and service are required, and the sudden addition of the heavy load may seriously affect the pressure in the neighborhood and lead to expensive street main additions, while the long-hour consumer requires but a small investment in mains, services and meters to carry him.

When the class rate and the reduction for quantity rate are combined, in some cases even more unsatisfactory conditions may exist than where either of the two are used separately. The above examples may be extreme cases, but they serve to illustrate conditions which really do exist. Assuming, therefore, that none of the above methods are just what might be desired, the question of a better method immediately arises.

In analyzing the various expenses which go to make up the cost of making and selling gas, we find that they may be divided into three groups.

The first of these groups contains those expenses which are regulated by the quantity of gas required at the time of the greatest demand during the year. This demand necessarily regulates the size of the works, capacity of the mains, and even the capacity of the service and meters. The expenses which may be proportioned to this group are caused solely by the amount of gas required by the consumer at the time of his greatest demand and are not in proportion to the amount of gas sold per month or to the number of consumers. Interest on investment should be included in this group.

The second group of expenses covers those which are regulated largely by the number of consumers. Certain expenses are incurred in reading meters, handling accounts, collecting bills, attending to complaints, etc., which are not proportional to either the amount of gas demanded at the time of peak load, or the amount of gas consumed by the individual consumers per month.

The third group covers expenses of manufacturing and distribution, which are regulated entirely by the amount of gas used without regard to demand or the number of consumers supplied.

It is our desire to sell as much gas as is possible at profitable rates, it should also be our desire to use a system of charging which can be applied to any individual consumer and which will give that consumer as low a rate as is consistent with a fair profit. Therefore, each of the above groups of expenses should be considered in making the rate, for if any 1 of the 3 charges is omitted, then 1 or both of the other 2 must be increased to cover the deficiency, and while this may readily be done in any individual case, no general application can follow which will allow us to sell gas to everyone at as low a rate as is consistent with a fair profit and still guard against doing business at a loss.

Assuming we find we can cover those expenses occasioned by maximum demand by a charge of $18 per year for 100 cubic feet of maximum instantaneous demand, and that we can cover those expenses which are regulated by the number of consumers by a charge of $12 per consumer per year, and assuming that, if these two items are taken care of, we can sell gas at 70 cents per 1,000 and still make a reasonable profit, then the following examples will illustrate how the rates for various classes of business work out. In each case the business is considered on a one month basis as gas bills are commonly rendered monthly.

Suppose we have a consumer using gas for lighting and that he demands, at the time of his greatest load, gas at the rate of 100 feet per hour, and that he uses 5,000 feet of gas per month. Assuming that the capacity charge of this consumer is $1.50 per 100 feet demand per month, and the consumer charge is $1 per consumer per month, and that gas is sold for 70 cents per 1,000, the man's bill will then be $1.50, plus $1, plus $3.50, or a total of $6.60, or $1.20 per 1,000.

Suppose now we have another lighting consumer who has exactly the same demand of 100 feet per hour, but that he uses 10,000 cubic feet per month. The same size mains and meter would be necessary as in the first case, and his capacity charge would be $1.50 and his consumer charge $1, and his gas would cost him $7 per month additional, making a total of $9.50, or 95 cents per 1,000. Such a consumer is evidently more profitable than the first consumer, and he gets a very much better rate. Yet there is no unjust discrimination, because the first consumer can get just the same rate if he burns the same amount of gas.

Suppose now we have a consumer who, instead of using gas for lighting, uses gas for a gas engine, for 10 hours a day. His demand is 100 cubic feet, or $1.50, and his consumer charge is $1, but he uses 30,000 cubic feet of gas per month. His bill will therefore be $1.50, plus $1, plus $21, or a total of $23.50, or 75 cents per 1,000. This consumer is evidently a very desirable one for the company, giving the same rate of profit per 1,000 feet sold as the other two cases, yet the consumer received a very much lower rate than in either of the other two cases.

Now, suppose that this engine consumer, instead of using 30,000 cubic feet, only uses 5,000 cubic feet. The demand charge of $1.50 and his consumer charge of $1 remain the same, and his gas costs him $3.50 in addition, making a total of $6, or $1.20 cents per 1,000. In this case the engine consumer has received the same rate as the lighting consumer in the first case, and this is just, because he has not used any more gas in proportion to his demand.

This way of charging for gas, which has been termed the "Readiness-to-Serve Method," therefore automatically prevents the granting of low rates to unprofitable consumers and encourages profitable consumers to be more profitable by giving them lower rates as they extend the hours during which they burn gas.

The question of how much the demand charge to each consumer should be is a difficult one, but in the absence of a satisfactory limiting device, the total capacity of the burners, or device for using gas, which the consumer may have connected, may be used as a basis.

Thus burners may be figured as having a demand of 5 feet each, engines as having a demand of 20 feet per rated horse power, and ranges and other appliances may be tested and their demand ascertained. The consumer may not use all his lights or appliances at one time more than a few times during the year, or not at all, but he expects the company to be ready to supply his full capacity at any time he desires to use it and the company must maintain the necessary equipment to give such a supply if the consumer desires it, and, therefore, the consumer should pay for the expense so occasioned.

It may also be contended that the greatest dem and of the various consumers will not come all at once, but that on some consumers it will come at one time of the month or year and at another time for others; but it would seem that any saving from this source is one of the results of the operation of a central plant, and that any profits accruing in this way legitimately belong to the company. If each building operated its individual plant, each plant would have to be large enough to supply the greatest demand, no matter when or how seldom it came.

The application of the readiness-to-serve rate can only benefit a limited number of consumers at first, as only those who are using gas for a comparatively long period in proportion to their demand receive any benefit from it, but undoubtedly a very large increase in profitable business would be cultivated and the average cost would be reduced by the addition of this profitable business, and in the end the other consumers would be benefited accordingly. Besides this, the class of consumers who found this rate profitable would be continually increased as more and more uses are found for gas and more people are convinced that it would pay them to use it.

The effect of such a rate on a company could not but be good, for it would enable the company to take on a large volume of profitable business which perhaps could not be reached by any other rate which could be made, without discrimination, by any other method of charging, and at the same time it would be a check against taking on unprofitable business at a low rate, which is always possible and frequently the case when any of the other methods are in use. In addition to this, a great deal of business would be retained which would be lost through dissatisfaction of the consumers, for where a considerable part of a bill consists of a fixed charge per month, variations of the bills which are due to longer use of gas in some individual month would not be so marked, and the tendency for such variations is to cause complaint. It is well known that a consumer who will cheerfully pay $60 per year on contract, at $5 per month, will complain bitterly when he pays the same amount per year but pays $2 in June and $8 in December.

Theoretically, every consumer should pay at least the cost which he occasions the company that supplies him, as otherwise he throws some of the expenses of supplying him on the other consumers, but practically this is never the case, and under the old uniform price per thousand rate, which has been strongly upheld in the courts, the profitable consumers carry a large percentage of the small consumers, who are supplied at less than cost.

As a matter of fact, if the readiness-to-serve rate were universally applied it would lead to the raising of the price of gas to all consumers who are unprofitable at the present time. This would mean that the price would be raised to a large number of small consumers, and this would lead to a great deal of complaint, and the consequences would probably be serious to any company that undertook such a course.

Even where the maximum rate which can be charged for gas is not fixed by law, it would, therefore, seem that the better plan would be to make the readiness-to-serve rate optional with the consumer and apply it only to such cases which would result in benefiting the consumer himself, using the rate previously in vogue for all other consumers.

Such a method would result in the giving of a lower and better price only to such consumers as were profitable already, and would open up the field of a large amount of business at present unattainable in many cases, while the present unprofitable consumers would not receive any reduction.

It is necessary before recommending the application of the readiness-to-serve rate to consider the legal aspect of the case. The old uniform meter rate of a fixed amount per 1,000, regardless of quantity or time of demand, has been firmly established by usage and by various decisions of the courts, and while this rate is probably the least equitable to the consumers of any that could be made, yet the fact that it had been many years in use and universally accepted would probably sustain it. The other rates, except the readiness-to-serve rate, are something more equitable but, still open to great criticism.

For instance, it is hard to justify the giving of a $1 rate for power purposes and $1.50 rate for lighting purposes, when the gas used for both purposes is used at exactly the same time and in the same quantity, which might easily be the case.

It is the intent of the law that every man should be treated alike, and, if the application of the readiness-to-serve rate is made optional, any man who desires may avail himself of it, and further, any man can get his gas at the same rate as any other man, provided his demand is the same and the quantity of gas he burns is the same. It has been held that it is not lawful for a public service corporation to reduce its rate to one consumer, if by so doing it increases the expenses to another consumer.

The readiness-to-serve rate does not do this because in its application every expense is covered, and no unprofitable consumer benefits by it. It would seem, therefore, that the readiness-to-serve rate is more nearly equitable than any other, and, therefore, probably legal.

Discussion.

The President—You have heard a very valuable paper and we should now like to have a discussion upon it.

Mr. Gardiner—Mr. President, in connection with this "readiness-to-serve" method, which I think we owe fundamentally to Mr. Doherty who first developed it as a result of certain cost analyses that he made as applying to electricity, and then to Mr. F. W. Frueauff, of Denver, Col., who applied it to gas, and it is the rate we are considering specifically. I think that perhaps a clearer understanding of its effect may be arrived at by taking up, first, the question of costs as they occur in the gas business. In former days it seemed to be considered that costs were essentially proportional solely to the output, and as an instance thereof we had in the gas business the old word "consumer," which it seems to me is a very fallacious term. It implies that the customer's principal relation to the company is dependent upon his consumption of gas. As a matter of fact, from a very extended analysis of the costs of conducting the gas business which I have made, I am forced to the conclusion that the supply of a given quantity of gas—that is the quantity supplied—is the lesser of the total costs, so that a man's consumption of gas is really, to my mind, the lesser factor of his relation to the gas company, and for that reason and other reasons I prefer the term "customer" to that of "consumer." In the cost of supplying gas, Mr. Doherty in his rate has, it seems to me, sought, in a customer charge and demand charge, to apportion and assess individually and collectively from the present customers of a company under present conditions what we might call fixed operating expenses and charges not varying with sales. Having freed the sales from these charges he has established a base line of output cost and return. For his base line of output cost and return, he charges at, suppose his average prices total on the old system, a uniform rate by meter, say $1.20 per 1,000 cubic feet. Having freed the output cost of the fixed expenses and charges he is then able to sell his entire output, we will say, at 70 cents. I am using entirely arbitrary figures. In this way he gets a constant, fixed apportionment and a true variable apportionment that varies with the actual consumption—the actual sales, and in which the net profits or net losses are directly proportional to the quantity of sales, the rates thereof, as I say, being freed from fixed expenses and charges.

The President—The hour has arrived which was made a special order yesterday for a discussion of the matter of amalgamation of various Gas Associations into the proposed American Gas Institute. Unless there is some objection, we will postpone the special order until the conclusion of this discussion.

Mr. Gardiner—Now, in analyzing the cost of gas, Mr. Doherty seems to have taken a customer cost in which he has included the total cost of handling the customers' accounts, collection expenses, etc., etc. He seems to have apportioned that by averaging that, as among all customers, and arriving, we will say, at a cost of $1 per customer per month. He seems to have treated his demand costs in the same way, apportioning his fixed charges on an average of so much per 100 cubic feet of hourly maximum rate demand. He has taken then his output costs and treated them in essentially the same manner. An understanding of this rate, it seems to me, throws a great deal of light upon other rates. It is a system which I use to work out and analyze the accounts and correct the errors and fallacies of other rates; for instance, the uniform rate by meter. I may say that I am absolutely opposed to any uniform rate by meter from a cost point of view. It seems to me the only thought we should give to the uniform rate by meter are two considerations. First, we must remember that the public likes it; that is a very important matter. The other consideration we should give to it is as to the means which we shall use to show the public that the uniform rate by meter is not to its best interests, and as to the other means to be used to get rid of a uniform rate by meter. It is exactly like a railroad company wherein we say the company is obliged to carry all freight at a rate of one cent per ton per mile. One cent per ton per mile would be a very nice rate for the fellow who wanted to transport fancy prints, silks, diamonds, gold bullion or anything of that kind, but it would be a prohibitive rate for a man who wanted to transport wheat, coal or ore, especially on long hauls. If you will consider the railroad business of this country and compare it with the railroad business for instance of Prussia, where the railroads are owned and operated by the government, you will find that in this country our average railroad rates are very much below the average railroad rates of Prussia. The reason of that is we have in our railroad rates a very wide differential. I do not mean a discriminative rate, but differential rates. The lower grade freights are carried at practically cost. A very large volume of business with very small profits per unit is built up thereby. So that the railroads serve the community to a much greater extent and at a much lower average price here than abroad. Apply this to the gas business. Suppose the railroads were obliged to carry all freight at one cent per ton per mile and the same system of charging was applied to the gas business. We cannot go above; we cannot go below. The consequence is we are absolutely prevented from applying the greater wants of the community in the lower grades of wholesale demand on our long hour burning business which we cannot reach at our average price. Of course, the community is the one that primarily is hit by this uniform rate by meter system, and secondarily it works very much against the development of the gas business. It works primarily, however, against the service of the public. I think I have said enough on uniform rates by meter. In the specific use system we separate the price for light, heat and power. I do not favor the system at all because the factors of differentiation in price are usually very minor or very subordinate to the differentiations made and are, therefore, open to criticism. Mr. Tuttle pointed that out, I think, quite clearly in his paper. I am personally very far from being satisfied with the Doherty rate, but it seems to me it is the most equitable, logical, most easily extended rate that has yet been formulated; but, as I say, I am very far from being satisfied with it. Entirely apart from the many intricacies of these rate systems, the "readiness-to-serve" method appeals to me as the best means now at hand of reducing the price of gas. Assume a gas company, selling on a uniform rate by meter at $1.25 per 1,000 with, as might as well be the case, half its customers unprofitable. If it can reduce its price to an average of $1.10 it might do so by a horizontal reduction to all and thereby increase the proportion of those who don't pay their own way. It seems to me that it would be more equitable to reduce the price only to those who pay

more than their costs. This can be done by retaining the old flat rates and putting in a Doherty optional rate. Analysis should show what present customers would individually profit thereby and in what total amount. The new rate would be so drawn that this amount will equal the reduction from $1.25 to $1.10 on the whole business.

The President—Mr. Gardiner, I am forced to interrupt you. We are trying to compress all business of the day into one session, and if there are many discussions of this length it cannot be done. Therefore, as much as I dislike to interrupt a speaker, it becomes necessary for me to do so at this time, because of the fact that we have a special order of business which was fixed for a certain hour and that hour has long since gone by. Will you kindly sum up the rest of what you have to say in as short a space as possible.

Mr. Gardiner—There are several matters I wanted to bring out a discussion on, but I do not wish to trespass upon the time of the Association and I will, therefore, stop where I am.

Mr. Butterworth—We are now inaugurating a "readiness-to-serve" method in Grand Rapids among all of our customers at this time. Over 3,000 of them we are placing arbitrarily on this method, because we know by their accounts they will be benefited financially by the change and will, therefore, not object so long as they can save money by it. We have altogether about 22,000 customers. We are going to offer this method of buying gas of us to the other 19,000 customers, and I have here a circular which we are sending out, explaining this method to them, which I would like to have published in the minutes of this meeting.

The President—I do not know of any subject that is any more interesting to this Association than this one, and I certainly regret we have not sufficient time to fully and thoroughly discuss it. Mr. Butterworth can you state in a word the contents of this circular.

Mr. Butterworth—In view of the brevity of time I will simply say we are offering a "readiness-to-serve rate" pure and simple, which is a customer's charge of $6 per year per meter, and a demand charge of $24 per year of 100 feet maximum instantaneous demand, and 70 cents gross, or 60 cents net per 1,000 feet for gas.

The President—That is optional for them to accept?

Mr. Butterworth—Yes.

The President—Do you find it being generally accepted?

Mr. Butterworth—We have not got that far. We think it will certainly be accepted by 3,000, and I think many of the rest will accept it.

is as follows:

The Butterworth Circular

The cost of supplying gas to a consumer is by no means proportional to the quantity which he uses. It costs much more per 1,000 feet to supply some consumers than to supply others; in fact, the cost varies with practically each consumer.

Cost Varies with Consumer's Maximum Demand.—For instance, let us take 2 consumers, A and B, each of whom, we will say, burns 50,000 feet of gas in a year. A burns a little gas every night, a little every morning and generally a little about noon each day, thus dividing his consumption quite evenly throughout the day and the year; while B, on the other hand, burns gas only in the evening and during only a few evenings in the year, although he then burns it quite freely. It is obvious that in order to supply B with gas it will be necessary for the company to provide a larger meter, a larger service pipe, a larger street main from his premises clear to the gas works, a larger gasholder and a larger gas works than are necessary in order to supply A. In other words, B entails a much greater investment upon the company than does A, although each consumes the same quantity of gas. It is not fair to A, therefore, that he should be required to pay as much per 1,000 feet for his gas as B should pay, if a flat price per 1,000 is the only basis of charging.

Fixed Cost per Consumer.—Again, each consumer, whether he burns much gas or little, and regardless of the size of his meter, service, street main, etc., in other words, irrespective of the amount of his consumption and maximum demand, occasions us certain fixed expenses, such as the cost of reading his meter monthly, making up his bills and delivering same monthly, doing all clerical and office work and bookkeeping incident to keeping his account, looking after his meter and maintaining and repairing same, and sundry other expenses, all of which are proportional only to the number of consumers (counting each meter a consumer) on the company's books and bear no relation whatever to his consumption. In fact, if there were no consumption at all these expenses would continue practically the same so long as the meter remained in the premises. It is obvious, therefore, that all consumers should pay the same "consumer's charge" per meter covering these expenses, and that under the usual flat rate per 1,000 method of charging for gas the small consumer pays less than his fair share of these expenses, while the large consumer, therefore, pays more than his fair share.

Injustice of Old Method.—Gas companies, and the public generally have come to realize that under the old method of charging, where all consumers pay only a flat price per 1,000 feet, some of them must necessarily pay less than their proportionate share of tne company's expenses and others more, and that the company's loss on those who pay less must necessarily be made up on those who are thus compelled to pay more.

An analysis of our consumers' accounts show that we lose money on about 30 per cent. of the total number of consumers, either because of their small consumption or of their large maximum demand in proportion to their total annual consumption, and this loss is necessarily made up by the remaining 70 per cent., who are thus paying more than would be required of them if an equitable method of charging were in force.

Equity of Mew Method.—Now, the readiness-to-serve method of charging overcomes all this unfairness and inequity. Under its complete operation each consumer pays exactly in proportion to the costs entailed upon the company in serving him, so that no consumer pays more than his proportionate share of the company's expenses. We are, therefore, offering it to this community in the hope of bringing about more equitable conditions. This method is optional with each consumer, he being at liberty to either adopt it or remain under our present method, under which the price of gas will continue to be 90 cents, net. If some of our consumers cannot advantageously adopt the readiness-to-serve method at this time it is because their consumption is very small, either actually or in proportion to their maximum demand, and also because our charges must for the time being remain high enough to enable us to carry the 30 per cent. of our consumers above referred to who are a source of actual loss to us, as we do not want to increase the price which they are now paying.

Benefit to Community.—In our desire to benefit the largest possible number of our consumers, however, we have fixed our charges under the readiness-to-serve method so low that, based on last year's total gas consumption in Grand Rapids, our receipts for the ensuing year will suffer a reduction of about $40,000. Our inauguration of this rate, therefore, means a substantial reduction in the cost of gas to this community as a whole. If our consumers shall take kindly to this new method of charging and increase their use of gas, as they can very cheaply do thereunder, further reductions under the readiness to-serve method will be made by us as soon as possible, until ultimately practically all of our consumers will be enjoying the advantages of this method of charging and the community as a whole will be paying a very low price for gas.

Explanation of "Readiness-to-Serve" Method.—The readiness-to-serve method is in vogue in several cities and is pronounced by experts to be the most equitable and logical of all systems of charging for gas. As stated above, each consumer pays exactly in proportion to the cost of serving him, this cost differing with practically each consumer. Every gas bill under this method will be made up of three elements:

(1.) The consumer's charge; (2) the demand charge, and (3) the gas charge.

The yearly "consumer's charge" is the same for each meter, because each meter entails the same cost upon the company whether little or much gas passes through it, or even if no gas passes through it. The "demand charge" carries with each consumer, according to the amount of his demand for gas at that moment during the year when he burns it at the greater rate. It covers the company's expenses in keeping its meter, service pipe, street main, gasholder and gas works large enough all the year around to meet this temporary maximum demand whenever it shall come, although that portion of the company's plant necessary to take care of this temporary demand may lie largely or wholly idle and unproductive during the remainder of the year.

For the present the size of the meter in use will be taken as the measure of this maximum demand. Each meter will be considered as having a capacity of 5 cubic feet of gas per hour per "meter light," and the "demand charge" will, therefore, be $24 per year, per 100 cubic feet of the meter capacity. If the consumer has 2 or more meters supplied through one service pipe, their total capacity will be the basis of the charge. Each consumer after the foregoing charges have been paid, then pays the same uniform price for gas per 1,000 feet, that price being extremely low. It will be seen that, under this method of charging, all consumers are treated absolutely alike, there being no discrimination whatever; whereas the grossest discrimination is inherent in the old method.

Fixed Charges are Yearly, not Monthly.—The "consumer's charge" and "demand charge" are yearly charges, although, for the sake of convenience and ease of payment, one-twelfth part of them is made payable with each month's gas bill, and as a part thereof. Therefore, although the premises of a consumer buying gas under this method may remain vacant during even several months of the year and no gas be consumed during that time, these fixed charges continue and must be paid. Each consumer's "year" begins at the time that he adopts this method of buying gas.

Under the operation of this method of charging, monthly gas bills will normally be more nearly uniform in size throughout the year than under the old method. Therefore, all comparisons of bills under this method with those under the old method should be made upon a yearly, and not upon a monthly, basis. In cases where consumers can figure little or no actual saving by the adoption of this method, based on the quantity of gas heretofore used by them, they should nevertheless bear in mind that if they should want to use more gas than heretofore its cost to them will be extremely low, so that it would be to their advantage to adopt this method under such circumstances.—GRAND RAPIDS GAS LIGHT COMPANY.

Mr. Low—I would like to ask Mr. Butterworth how the maximum demand for gas is arrived at? Take a gas stove, for instance, which has 7 or 8 burners; how are we going to arrive at the maximum demand?

Mr. Butterworth—Briefly, we arrive at the maximum demand by the size of the meter which shows maximum demand. For the present that seems to be the best method. There may be something better than that later on.

Mr. Low—Perhaps it will be interesting to the Association for me to relate one little incident. Last year the City Council decided that we were not doing business on business principles. We were making a demand charge for electricity of 12½ cents and a 5-cent running charge. But they could not figure it out. I made an experiment with reference to a planing mill, principally because one of the councilmen happened to be a planing mill man. After figuring it out for him he decided that the rate we were charging was all right.

Mr. Forstall—As a matter of history I would like to suggest that the subject of charges, based not entirely upon amounts of gas consumed, was taken up some time before Mr. Doherty took it up. It was treated of in a paper read in 1891, by Mr. Walton Clark, before the American Gas Light Association. I would like to ask Mr. Tuttle if he has any idea that he can get all his customers to accept $1.50 per month charge for 100 feet maximum demand, and I would also like to ask Mr. Butterworth if he has any idea that he can get any considerable proportion of his 19,000 customers to accept $2 per month charge maximum demand? I am inclined to think he will find it very difficult and he will not reach the people that he is trying to reach, or rather that he will not hit the people that he is trying to hit. I have gone into this subject in a very modified way and in a very small town. I did not try to bribe the people at all. I simply said they must do it. I made the rate and if they wanted gas they had to take it at that rate. As I explained before, in that particular town there is not a very large maximum charge. For our own convenience we have arrangements made so that we can make all the gas we need in 24 hours in about 3 hours, so that the maximum charge does not amount to very much. I simply made a consumers' charge and a price for gas. I let the people down too easy at the start. I made the customers' charge too low. There is no customer in that town who does not pay at least $2 per year. This year we are going to make a change in the price so that anybody who burns less than 3,000 cubic feet per year pays us under the new schedule, an increased price, and those who burn over 3,000 get their gas for less. The customer who burns over 3,000 cubic feet gets his gas at an average reduction of about 10 per cent. from the old price. The next time I make a change I am going to put the price up a little higher to the man burning less than 3,000 cubic feet per year, and keep on increasing it until I hope to finally get rid of him. I do not think you can make a maximum charge anything like the amount that Mr. Tuttle and Mr. Butterworth figured and make it universally.

Mr. Butterworth—Our demand charges per month are only $1 per month instead of $2, as Mr. Forstall has suggested. We feel certain that a large portion of the 19,000 customers will be interested in this rate. I figure that 1,000 will come in voluntarily in addition to the 3,000 referred to.

Mr. Lloyd—I would like to ask, if a uniform charge of 60 or 70 cents is made for gas to all customers, how are we to secure and hold the engine business? For instance, suppose we found it would be profitable to sell gas for that purpose for 50 cents. On one page of Mr. Tuttle's paper he supposed a case where we have a customer using gas for lighting which he figures out at $1.20 per 1,000. On another page, with the same man using the same quantity of gas for engine purposes, he arrives at the same price. Now, if the illustrations were reversed, might it not be possible that you would give your lighting customers a very low rate for gas consumed at the time of maximum demand and penalize the use of gas which would be principally used in the earlier hours of the day when the plant is not taxed.

Mr. Tuttle—As to Mr. Gardiner's statement, with reference to the opportunity for socialistic attack, I would say that there are very few large companies that are not now making special rates for power and industrical purposes, and certainly no companies are getting much of that business that are not selling gas below the ordinary rate for which gas is furnished to the small consumers. Socialistic attack is invited just as much when selling gas for 80 cents for power and $1 for light as it is when you are giving a readiness-to-serve rate of 70 cents. With regard to the question as to whether we can get all our customers to accept this rate, I stated in my paper I only expected to get a portion of them, and a small portion at first. I only want to give that rate to people entitled to it. Then if the other people increase their demand so as to avail themselves of the rate they will be entitled to it and be permitted to enjoy it. We have taken all of the different factors of cost into consideration. For instance, take the big engine consumer who gets gas at a very low rate and the man who burns only 1,000 cubic feet at his house does not get it. In this way we keep out those that we do not want to get the benefit of the low rate and we secure those who are entitled to it.

Mr. Lloyd—How can you reach the gas engine consumer at 50 cents per 1,000?

Mr. Tuttle—I never yet found it necessary to meet that rate and we have quite a little gas engine business. I would say this, if you can afford to supply a gas engine consumer at 50 cents per 1,000, and take all your factors of cost into consideration, then your readiness-to-serve rate must be below 50 cents. It is simply a matter of bookkeeping. If you are selling that man gas at less than cost it does not pay you to do it, but if you can afford to sell him for less than 50 cents, then your readiness-to-serve rate would be way below that. In regard to the question as to whether or not we are discriminating against people by not giving a better rate on engines for instance than we do on lighting, I would say that the loads are very apt to overlap and do overlap in nearly every city in the winter. In December they do it both in the electric business and in the gas business. We certainly recognize it in the electric lighting business that the power load laps over the lighting load in the early evening hours.

It was then moved, seconded and carried that a hearty vote of thanks be extended to Mr. Tuttle for his very valuable paper.

THE SPECIAL ORDER.

The President—Now, gentlemen, the time for the special order as suggested by Mr. Butterworth has arrived some time ago. What is your pleasure?

Mr. Butterworth—Mr. President I suggest that the Committee on President's Address now make its report because that report will naturally bring up this very subject which has been made a special order.

The President—According to the printed programme the Report of the Committee on President's Address is to be heard at the last session of the convention. The address contains, however, only one important matter and that matter is in the hands of the committee of which Mr. Butterworth is Chairman. I will entertain a motion, if there is one made, to now take up the Report of the Committee on President's Address, which will naturally bring up the subject which has been made a special order.

It was then moved by Mr. McIlhenny, seconded by Mr. Andrews, and carried, that the report of the Committee on President's Address be submitted at once.

Mr. Irvin Butterworth then submitted the following

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS:

The address of our President is characteristically plain, businesslike, and to the point. It is all kernel with no chaff. We are encouraged by its optimistic tone with reference to the danger from municipal ownership, and appreciate its suggestion as to the wisdom of investigating the merits of the vertical retort system.

We recommend that the Association, at this meeting, carry out the President's recommendations with reference to the appointment of a

committee with plenary powers to co-operate with similar committees from the American and Western Associations in the formation of the proposed American Gas Institute and the merging into same of this Association.

The President's complimentary and graceful acknowledgment of his personal obligations to this Association constrain your committee to express the belief that the obligation is mutual and that the Association has received from him during his membership with us fully as much benefit as it has imparted. Respectfully submitted,

IRVIN BUTTERWORTH,
W. E STEINWEDELL,
E. H. EARNSHAW,
} Committee.

The President—Does your report specify the number to be on that committee?

Mr. Butterworth—No.

The President—I would suggest that you have your report limit the number of the committee to a membership of 5, and provide that such committee is to be appointed by the President.

Mr. Butterworth—With the consent of my colleagues on the committee I will have the suggestion of the Chair embodied in and made a part of the report of the committee.

The President—Gentlemen, you now have before you the report of the committee, which carries with it the most important action that the Ohio Gas Light Association has ever been called upon to take. Discussion of the report is now in order.

It was then moved by Mr. McIlhenny, seconded by Mr. Forstall and unanimously carried that the report of the Committee on President's Address be received and adopted.

The President—I appoint as the committee Messrs. Irvin Butterworth, John D. McIlhenny, Paul Doty, F. H. Shelton and Henry L. Doherty. Now, gentlemen. what I feared would be a long horse and a difficult one to carry has turned out to be a very short one. We will proceed with the programme.

(To be Continued.)

The Morton Memorial Volume and Its Contents.

The Stevens Institute of Technology, of Hoboken, N. J., is to be congratulated on the publication of this book. It is a worthy memorial to the great and lasting genius of President Henry Morton, who so successfully organized and conducted the affairs of that Institution for more than 30 years. It is most fitting that the record of his life work, prepared by his friend and successor, Dr. Alexander C. Humphreys, should be so fully preserved in this memorial volume. We do not recall ever having seen a richer or more complete university or college publication, and to its editor, Franklin DeRonde Furman, M.E., Professor of Mechanical Drawing and Designing at Stevens Institute, is due the credit of originating the book under this title and carrying it through to a successful completion.

At the time of the twenty-fifth anniversary of Stevens Institute, in 1897, President Morton planned a souvenir book, and from that time to his death, in 1902, he spent many of his leisure hours in collecting material for it; he also spent over $1,500 for many of the excellent and original illustrations in which the book abounds. In his will, President Morton left means for carrying on this work as a 25th anniversary souvenir publication, but it was deemed more advisable and appropriate to change it to a memorial to Dr. Morton.

Excellent photogravures, with signatures of Edwin A. Stevens, founder, and Henry Morton, organizer, and first President of Stevens Institute—the first school of Mechanical Engineering. It was opened on the third Wednesday of September, 1871, and graduated its first student, J. Augustus Henderson, in June, 1873. The work of the "Original Faculty" numbering 8, and now grown to 28, and the "Early Scientific and Popular Public Lectures" at the Institute, still well remembered by many of the older generation, are all recorded.

The growth of the Institute is clearly portrayed, the financial side, starting with $650,000, from Edwin A. Stevens, $150,000 of which was for buildings and $500,000 for endowment. Of this latter sum $45,000 was levied by the United States Government in 1869, under special legislation which was shortly repealed. Many who were subject to this special tax, as Stevens Institute was, but who did not pay promptly, were never required to pay. During the past winter President Humphreys and friends of the Institute have made strenuous efforts to have the Government refund this sum. The matter is still under consideration at Washington and it would not only be just, but a very small recognition of what the Stevens family of pioneer engineers did for this country in the early part of the 19th century, should the Government refund this tax with interest.

President Morton's gifts to Stevens Institute during his administration amounted to more than $145,000. Mr. Andrew Carnegie, a Trustee of the Institute, has given a total of $290,000, of which $65,000 was devoted to building the Carnegie Laboratory of Engineering in 1902, and $225,000 to its endowment. Members of the Stevens family have given valuable property to the Institute. The alumni of Stevens have contributed a large sum, which, together with President Morton's gifts for a chemical laboratory, amount to over $100,000. This has been devoted to building the recently completed Morton Memorial Laboratory of Chemistry. These gifts, together with perhaps a total of $20,000 from scholarship funds, bequests, etc., represent the financial growth of the Institute. From this it would appear that a great work has been accomplished by this Institution on a most economical and efficient basis.

The "Course of Study," for which there was no precedent when the Institute was started, shows that the growth has been along the lines laid down at the start by President Morton and his original faculty, with the addition of the subjects of electrical engineering and business engineering, which have since been introduced. The attendance has grown, from 6 in 1871 to 418 in 1906. The Stevens Institute gives only one degree, that being Mechanical Engineer. Owing to the large amount of electrical work in the course, the matter of giving a separate degree of electrical engineer has been considered recently, but the feeling among the graduates, many of whom are prominent electrical engineers, was strongly against giving any degree but that of M.E.

The remainder of the "History of the Institute" deals with the "Alteration to the Main Building, and New Buildings," the "25th Anniversary Celebration," the "Dedication of the Carnegie Laboratory," the "Inauguration of President Humphreys," the "Alumni Association," the "Stevens Institute Indicator," and "Student Enterprises." In the latter division we imagine the alumnus will find many references that will recall associations of his college days.

The section of the book devoted to the "Stevens family" is a most valuable and interesting collection of the pioneer engineering work accomplished by John Stevens and his two sons, Robert L. and Edwin A. Stevens. It is prefaced with a general resumé of their work, prepared by Mr. T. C. Martin, of the *Electrical World*. Extracts from old documents and manuscripts are given, and, in all, a strong presentation is made of the engineering work of these men, which has never been fully recognized by the government nor by the engineering profession, as testified to by Rear-Admiral George W. Melville, U.S.N., now retired, in a public address in 1897. The section tells how Mr. John Stevens purchased, at public sale in 1784, the island of Hoboken, which had been confiscated from the Tory, William Bayard, who, curiously enough, is in the ancestral line of Martha Bayard Stevens, the wife of the founder of Stevens Institute.

It is related how John Stevens, in 1812, advised the Legislature of the State of New York against the construction of the Erie Canal, proposing instead a steam railroad and stating that the speed of trains could be made to average 30 miles an hour, and that the speed of the pigeon's flight could be attained. A curious coincidence lies in the fact that, during the early days of the Camden and Amboy Railroad (now the Pennsylvania), 20 years later a pigeon in attempting to cross the front of the locomotive was struck down by it; how he operated a small steamboat with a propeller on the Hudson river in 1804; how he built his own engine in this country for his commercial boat, the "Phœnix," which he had in operation within a few months after Fulton's "Clermont," the engines for which were imported from England; how the "Phœnix," being precluded by the monopoly which Fulton's success had obtained for him, of the waters of New York, was sent around to Philadelphia and was thus the first steam propelled vessel to encounter the might of the ocean; how he operated a steam locomotive on a circular track in Hoboken in 1826; and then, in 1831, with his sons, started the Camden and Amboy Railroad in the service between New York and Philadelphia; how they placed under construction under U.S. Government contract the first ironclad war vessel in 1842, and spent over $1,000,000 out of their private fortunes in developing the first armored vessel, which, largely because of technical differences, was not accepted by the U. S. Government and was never launched. It was finally broken up and sold to second-hand material dealers. The Stevens family has never been reimbursed for this outlay.

There is given also the story of the invention of the first T-rail now so largely used in steam railroad service, with facsimile of the original sketch and specifications from which they were made and a list of the

vessels and their tonnages, dates, etc., which brought the first T-rails from Wales to this country, the first ship, the "Charlemagne," landing May 16, 1831, with 504 tons of 18-foot rails weighing 36 pounds per yard. These, and many other interesting facts, are presented in this section devoted to the Stevens family, and many mechanical and engineering details now so common to the present generation found their origin in the fertile minds of John Stevens and his two sons.

The third section of the book is devoted to the biographies of the trustees, faculty and alumni. Thirty pages, with many interesting illustrations, are given to the biography of Dr. Morton. In the biographies of the faculty may be found valuable lists of the writings of Dr. Morton and Professors A. M. Mayer, R. H. Thurston, DeVolsen Wood and A. R. Leeds, all now deceased; also, of Professors C. W. MacCord, J. B. Webb, T. B. Stillman, J. E. Denton and D. S. Jacobus.

In biographical lists generally only the more prominent men are generally written up, but in this volume every graduate of Stevens Institute is included. This section of the book, therefore, has not only a local but a general value, especially to the student of educational matters. The biographical records, in all cases, are intended to cover briefly family and general facts in addition to the account of technical work done by the men since graduation. Thus one may gather not only the character of work done by a technical graduate, but also the character of the men themselves who have helped much to advance the profession of mechanical engineering during the past 35 years. Photographs of nearly one-half of the graduates are shown.

From the artisan's point of view the book is extremely well done. It contains over 600 pages, is printed on the best quality of book paper and is bound in half morocco, in black, with the lettering "Morton Memorial" and "Stevens Institute of Technology," and the Institute seal in gold. In addition to over 400 photographs of trustees, faculty and alumni, the book is illustrated with over 200 general subjects. The book was not prepared with a view to general sales and only a few copies are held for disposal among those who may be specially interested. The price of the book is $10, and we can say that, considering the quality of the book and the comparatively small number issued, this would not cover the cost of production. This price does not measure the value of the book, and it is made possible now, we find, only through contributions made by President Morton before his death when it was looked upon as a Twenty-fifth Anniversary Volume, and the Alumni Association of Stevens Institute who have been financially responsible for the work.

A Few Notes About Gas Mains.

At the last meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers, Mr. Octavius Thomas read the following paper on the subject named in the heading:

The district of gas supply over which I have control comprises the greater part of the two Rhondda Valleys, and covers an area of nearly 20,000 acres and a population of 100,000 persons. It extends from Trehafod right through the Rhondda Fawr Valley (or large valley) and as far as Tylorstown in the Rhondda Fach Valley (or small valley). The lowest point supplied is 270 feet and the highest over 1,000 feet above ordnance datum. The Rhondda Fawr Valley is 11¼ miles in length, and the Rhondda Fach Valley, in my district, is 2½ miles long. Houses are built on practically the whole length of the main roads through the valleys, with small towns or villages here and there, the number of different places supplied being 23. The district is supplied from two gas works, one situated at Porth (300 feet above ordnance datum), which is at the lower end of the large valley, and the other at Ystrad (480 feet above ordnance datum), in the middle of the Rhondda Fawr Valley, and about 5½ miles from the Porth works. The consumption of gas in the past 8 years has increased from 74,000,000 cubic feet per annum to 160,000,000 cubic feet; the quantity of gas produced at the Porth works being about 10 per cent. more than at Ystrad works. Gas mains are laid along the main roads in the whole length of each valley, the total length being 45 miles, varying in size from 15 inches to 2 inches in diameter.

How an Increased Demand was Met.—In obtaining such an increased consumption of gas an extension of the manufacturing plant and storage has been necessary. In 1900 the supply of gas to one part of my district, situated about 3 miles above the Porth works and 2½ miles below the Ystrad works, became very deficient, and the question of increasing the size of the trunk mains had to be taken in hand, additional gasholder storage being required at the same time. Not having any room at the Porth works for a gasholder, and the works being surrounded by houses, I went into the question of erecting a gasholder in the middle of this district and so saving the expense of laying larger mains, the intention being to pump gas into the holder during the day, by means of a gas engine and exhauster, from the existing mains and return it into the same mains through a governor during lighting time as required.

At this time the consumption of gas was increasing rapidly, and in dealing with this matter I made due provision for a large increase, which has occurred, as shown by the figures already given to you. I estimated the cost of this main would be $30,000; and the annual interest and repayment of the loan, if borrowed at 3¾ per cent. for a period of 30 years, which is the usual time allowed by the Local Government Board, would be $1,680. There would also be an additional annul cost of repairs to the larger mains from subsidence, etc. Against this the cost of a governor, exhauster and house, with the necessary connections, amounted to $3,250. The annual interest and repayment of this loan is $180, and the cost of gas, labor, pumping and attending to the governor amounts to $500 per annum, making a total of $680. I have not taken into consideration the cost of the land and gasholder, as this would be the same in either case. After duly considering the matter I decided to erect the gasholder in the district and not lay any larger mains, and it has worked most satisfactorily. I have a by-pass with governor attached to the exhauster, as my supply for filling the gasholder is taken from a live main. By these means I always maintain a minimum pressure of 15-tenths in the district during the period of pumping, and have no difficulty in giving a full supply to gas engines working in the locality and other consumers at the same time.

Leakage in a Mining District.—The celebrated Rhondda steam coal being worked under the whole of this district, the leakage of gas from mains and service pipes and the necessary repairs are serious items in the revenue account every year. You will be surprised to learn that during 12 months I have repaired no less than 1,500 leaky joints and broken mains. In some places in the district I find the mains are drawn apart. In one instance I found a service pipe to a street lamp drawn apart no less than 9 inches; but fortunately this was in a clay soil and the gas passed through the opening left where the gas pipe had been. In other places I find the mains squeezed together until eventually the socket becomes smashed, and then the pipe is able to move forward. In one instance of this sort I had a 6-inch main smashed, and the spigot end of the pipe was found 4½ inches beyond the end of the socket after the fracture. I have fixed expansion joints on the sides of the hills, which help the main to give a little, but, in spite of this, I am continually repairing leaky joints between them. When you realize that millions of tons of coal, etc., are taken out of the valley yearly and that the whole of one part of my district has dropped 5 feet in the past 20 years, you will see one must have anxious times.

"*What is a Main?*"—The Editor of the *Gas World* in September last asked the question, "What is a main?" in reference to the calculations made as to the number of consumers per mile of main, etc. My definition of a main is—a pipe laid in and running parallel to any road from which branch pipes are taken off to supply consumers or street lamps, these being called service pipes. In estimating the consumption per mile of main, etc., I consider that all pipes coming under this description, even if only 1 inch in diameter, should be included in the length. I have had this question before me on several occasions in connection with a demand for a supply of gas from private consumers and local authorities. The Gas Works Clauses' Act, 1871, being incorporated in every gas company's Act of Parliament, the right of demanding a supply of gas by owners and occupiers of premises is governed by Sec. 11 of that Act, which reads as follows: "The undertakers shall, upon being required so to do by the owner or occupier of any premises situate within 25 yards from any main of the undertakers, or such other distance as may be prescribed, give and continue to give a supply of gas for such premises, etc." As no other distance is usually prescribed, it may be taken in this case that the gas company is bound to supply within the 25 yards. The right of demanding a supply of gas by local authorities is governed by Sec. 24 of the same Act, which is as follows: "The undertakers shall supply gas to any public lamps within the distance of 50 yards from any of the mains of the undertakers in such quantities as the local authority of each district or the trustees of any turnpike road or any highway board within the limits of the special Act may from time to time require to be supplied," etc.

Under each of the above sections the question to be decided is "What is a Main?" Let me give an example of what I mean. A main was laid to a certain point in a road and a street lamp fixed at that point; the local authority decided to erect lamps beyond, and submitted a plan showing 10 lamps required at a distance of 80 yards apart.

The gas company declined to lay the necessary main, stating that the revenue was not sufficient to pay interest on the outlay. Later the local authority submitted another plan showing the lamps 50 yards apart. The gas company were then obliged to lay the main under section 24 of the Gas Works' Clauses Act 1871. The size of the main has to be settled by the manager of the gas company, and assuming in this case be decided to lay a 1-inch pipe to the last two lamps, then I submit this would still be a main, and the local authority could demand a supply of gas for a lamp or lamps beyond, provided they were not more than 50 yards apart.

Two Gallons of Gasoline.

Iron Age says that very few owners of automobiles are interested in endurance tests. They never expect their machines to travel 500 or 1,000 miles without stopping, nor do they contemplate this method of crossing the Continent. Freak runs do not constitute any part of their itinerary; also few care whether their motors are capable of 50 or 70 miles an hour. Most owners are satisfied to go a reasonable distance at a speed that will not endanger the life of anyone. Even the scorcher, after a little, will complacently examine a machine about to overtake him and permit it to pass without any twinges of conscience; he has not forgotten his cunning; he has only resumed his place as a sane man among men.

But all—manufacturer and owner, rich and moderately poor—are concerned in such a test as that of last Saturday. The experiment was a run over a route from New York through Stamford, Bridgeport and New Haven. The object was to determine how far an automobile could travel over ordinary country roads with a consumption of 2 gallons of gasoline. The test had nothing to do with endurance or speed, and the comparatively small and light car had the same chance of success as the most powerful. There were 71 machines entered in the contest, and of these 65 started. They varied in size from the little single cylinder buckboard to the high powered touring car and represented almost every pattern of automobile. A system of handicapping was adopted in order to place all the machines as nearly as possible on the same footing. Each was supplied with 2 gallons of gasoline at the start. There was no limit regarding time—distance was the sole object.

The best performance was by a 4-cylinder runabout of 12-horse power, weighing 1,500 pounds. On one charge of fuel it ran 87 miles, or a short distance beyond New Haven. Another car of the same make and precisely the same pattern made only 58 miles.

Fifteen hundred pounds moved 87 miles on 2 gallons of gasoline means 66 ton-miles at a cost of 36 cents for fuel. This is a ton-mile for ½ cent. Taking into consideration the fact that the roads were unusually heavy part of the way—it rained during the trial—the result is remarkable and compares most favorably with the cost of haulage on the railroad with its perfect track.

In a trial of this character the "personal equation" appears in very large proportions. Of two cars identically the same and operated under like conditions one travels over 40 per cent. further than the other. The explanation is to be found in the difference in the skill and judgment of the two drivers, and a parallel case is found in the engineers in control of 2 locomotives of the same pattern. One will get more work out of his engine with less fuel than the other. A trial of this kind cannot be won under a continuous use of the same power; the rate must be changed almost constantly in order to take advantage of variations in the road and grade. Running the automobile to its full capacity all the time, or at a snail's pace, never would have produced the result. It is probable that if the trial were repeated with the two drivers exchanging places success would follow the one who made the best showing last Saturday.

The Depreciation of Electrical Properties.

In a paper read by Prof. G. W. Bissell, of Ames, Ia., at the convention of the Iowa Electrical Association, Des Moines, April 19, 1906, on the above subject. The following were some of the points he brought out:

As a preliminary to the preparation of this paper, the writer sent to each member of the association a letter propounding and asking replies to the following inquiries:

1. In computing the total cost of your output, do you make allowance for depreciation:

2. If the answer to No. 1 is affirmative, how much depreciation do you charge off, and how do you arrive at this amount?

3. How do you invest your sinking fund?

Twenty replies were received. Three answered questions 1 and 3 in the negative without explanation or other sign of interest in the matter and they, of course, gave no answer to question 2.

Four members answered question No. 1 in the negative, but explained that circumstances, such as pressure for dividends, prevented the practice, or regretted that extensive renewals of deteriorated property had prevented, or that the plant was not yet old enough to be affected by depreciation; but all four evidently appreciated the importance of the subject.

Two members took issue against the recognition of depreciation as an account to be considered in making a true book showing of the property. Attention will be called to these arguments later.

One member answered question No. 1 in the affirmative and No. 3 in the negative and evidently confused depreciation and maintenance.

The remainder, ten in number, gave affirmative and more or less complete answers to the three inquiries, and quotations from the letters are here presented.

1. "We set aside about 5 per cent. of gross investment each year for maintenance of property."

2. "We use the replacement value of the plant equipment as a base on which to figure depreciation. * * * The fund derived from these amounts is deposited in the bank as a time deposit and draws interest. It can only be withdrawn by consent of our board of directors. All amounts realized from sale of replaced machinery, scrap, wire or any part of our equipment, are credited to this account. Sinking fund is for bond redemption only."

3. "Upon the actual cost of our plant we figure a depreciation of 8 per cent. and invest the amount where we can find and receive the best interest rate."

4. "Charges of 8 per cent. annually, investing not to exceed one-half in improvements and the balance in the bank at 4 per cent. per annum for replacements."

5. "We figure 6 per cent. for depreciation in computing the cost of energy, bnt have never been able to create a sinking fund to take care of the item. We consider 6 per cent. a low figure."

6. "We charge 5 per cent. of our total investment each year for depreciation. Ten years' experience shows that this is not enough, and hereafter the charge will be 7 per cent.

"Depreciation is the one thing that makes electric lighting in a small town a poor business."

7. "As a rule electric installation is without sufficient capital. They soon find themselves face to face with the proposition of providing for their extensions and depreciation, and at the same time meet the expectations of the stockholders for dividends. It has been our custom to put sufficient money into the plant each year in the way of repairs to maintain its value. The objection to this plan of providing for depreciation is that it is not uniform. One year we have little or no repairs, while next year the repairs are excessive.

"In the present state of the business I should think a fair allowance for depreciation would be from 8 to 10 per cent. on the cost of construction. While it is true that electric apparatus as built to-day perhaps has a life of more than 10 years, still in the readjustment of things occasioned by the growth and development of the business and the growth and development of appliances, our past experience will indicate that we will rarely ever use a piece of machinery more than 10 years.

"We believe that a fixed per cent. on original cost should be placed in the sinking fund each year to provide for depreciation, and that this sinking fund should be invested to the best possible advantage; but we think you will find very few companies in this State providing a sinking fund.

"It is not wise for a manager to overlook this item because it is something that must be provided for, and while he may be able to evade it for a few years, it will finally present itself in an aggravated form and there is no escape."

8. "We had no bonded indebtedness until May, 1904, when a mortgage of $650,000 was given to secure a bond issue in like amount. The entire proceeds from the sale of bonds, with an additional $100,000 advanced by the stockholders on the company's note, was put into the reconstruction of the property. The physical condition of the plant previous to the reconstruction was exceedingly bad, and the entire income was required for repairs and operation, leaving no surplus for dividends or other purposes.

"Under Article XIII. of the general trust deed the following provision is made for a sinking fund:

"'A sinking fund shall be created and maintained during the uncancelled existence of this mortgage for the payment in part of the

principal of the bonds hereby secured, and shall consist of the payment in the sum of $15,000 on the 30th day of April in each year on and after April 30, 1908, by the company to the trustees, which annual payment company agrees to make to the trustees.'

"'It is further provided that the trustees shall hold the annual payments until the disbursement thereof, allowing the company interest thereon; this interest to be added to the sinking fund annually. The money so accumulating shall be used from time to time for the purchase by the trustees of the bonds as a price not to exceed 5 per cent. par; the bonds so purchased shall be cancelled and delivered to the company.'

"You will note that the annual payment of the $15,000 is not effective until 1908. We are with the commencement of the year, however, charging off 20 per cent. of the gross receipts each month to depreciation and maintenance. From this amount we subtract the actual maintenanee cost for the month, the balance being charged to depreciation.

"In my opinion there are few companies in the State which have a broad provision for depreciation and sinking fund. This provision should undoubtedly be made, otherwise at the expiration of the life of the bond issue, the property will be sadly depreciated in value and no funds in hand to put the same in the physical condition which attained at the issuance of the bonds.

"Capital is becoming more insistent that sinking fund provisions be made, although the majority of bond issues now in effect carry no such provision."

The above quotations and other information contained in the letters of the members who believe in and practice the recognition of depreciation as a factor in central station finance are from cities of from 3,000 to 50,000 population widely distributed over the State. Evidently some plant managers are thinking hard over the question.

Reference has been made to members presenting arguments against depreciation as an element of productive cost. One member writes, "In regard to depreciation, I will say that I differ from most people on this subject. We do not charge off any depreciation. When any part of our machinery gives out we repair it or replace it with new and charge it to expense. If a pole is decayed and unsafe we replace it with a new pole and charge it to expense, and so on through the entire system. In this way we pay for our depreciation as it comes. We classify our accounts to a certain extent. We have an account for meters, transformers, coal, repairs to boilers, station supplies, equipment, etc. Meter repairs are charged to expense, and new additional meters are charged up to meters. A new meter to replace an old one is charged to expense. Same with transformers, etc. Annually, or as often as desired, we can balance up our accounts and see how we stand."

But he concludes with this statement, "If a plant is making more than a fair dividend I would set aside some of it for a surplus and put it in a good bank at interest. Then in case of a breakdown or extension of plant there would be some ready money."

It would seem as though the last statement qualifies materially the non-belief in depreciation accounts and that the writer really would charge off depreciation if his business would pay him well enough to enable him to do so.

Another member writes, "If a plant is earning sufficient money to take care of the maintenance which must include all replacements and renewals, and interest on the investment, and has anything left it would seem better to pay it to the stockholders in extra dividends than to run the risk of holding it in a sinking fund. Keeping the fund safely would be a problem. Keeping it profitably invested, still more of one; but when it is paid to the stockholders as it accumulates all this is avoided."

To this view of the case there might be presented the question, How will these same stockholders feel if extraordinary expense, such as replacing obsolete equipment, necessitate an assessment? and how much worse will their heirs or assigns feel who have not directly received the previous large dividends? Is it not better to anticipate such a contingency by having a fund to meet it?

The author then takes up the theory of depreciation calculations as laid down by Matheson in his book on "Depreciation of Factories," and figures on a concrete example of factory depreciation. He also quotes percentages of depreciation from Dawson's "Engineering and Electric Traction Pocket Book."

As to the method of investment of the depreciation sinking fund, there are several avenues for ready money. Improvements in the plant or extensions are legitimate if they will pay the interest on which the annuity is based. Otherwise not. A line 10 blocks long to supply light to 1 or 2 houses at the end would not be remunerative enough for this purpose. It should be constantly borne in mind that the depreciation allowances are each specific and their use for other purposes should not be tolerated.

Repairs and maintenance must be regarded as distinct from depreciasinking fund, and it is necessary that they be otherwise provided for.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE following letter from Mr. B. S. Pedersen, which is the first direct news that we received from San Francisco since the recent terrible disaster, was written in that city on the 10th inst.:

To the AMERICAN GAS LIGHT JOURNAL: Gentlemen—Having lost my entire files of the AMERICAN GAS LIGHT JOURNAL, an accumulation of the number of years that I have been a subscriber to same, in the recent fire in San Francisco, I should like to know very much if you can furnish me with duplicate copies, bound or unbound. It was my misfortune, in common with a few other gas men to lose our entire libraries, some being accumulations of from 15 to 20 years, but we all expect to start in again to improve on the quality if not the quantity of our libraries. Mr. E. C. Jones is doing yeoman's work in getting gas to San Francisco again. We expect to be furnished with gas within a day or two over the entire unburnt section, some districts having already secured service. Mr. O. N. Guldlin, of Fort Wayne Ind., and Mr. F. K. Lane, of Seattle, passed through here on a visit, bringing with them some of the "necessary," which was much appreciated by us all.

MR. GEORGE H. HARPER has resigned his position as Manager of the Altoona (Pa.) Gas Company. The correspondent who forwards this information adds: "Mr. Harper came to Altoona over 13 years ago and took charge of the Altoona gas plant. Four years ago he was made Manager and under his direction great improvements were made and the plant enlarged to one of the biggest and best in the country. Meantime he was lowering the price of gas to the Altoona public. While it is not yet down to where it ought to be, at the same time it should be borne in mind that in comparatively few cities is gas sold as low as Altoona."

A CORRESPONDENT in Detroit, Mich , writing under date of the 11th inst., incloses the following from the *Free Press*, of that city: "Official approval of 80 cent gas for Detroit was given by the Board of Directors of the Detroit City Gas Company yesterday, and the new Manager, Col. E. G. Pratt, was instructed to go ahead on that basis. Plans are made for removing the double meters as fast as this can be done. 'There will be no change in the policy of the Company under my management,' said Mr. Pratt with a smile, 'I only hope,' he continued, 'that I may be able to make as many friends in so short a time as Mr. Lathrop has done, and I am now principally engaged in becoming acquainted with the community.' Mr. Lathrop laughingly remarked that what he had been working for for months, 80-cent gas, had become a reality on the first day upon which Mr. Pratt took the management of the Detroit Company. While pleased with the promotion, Mr. Lathrop regrets leaving Detroit, where he says his associations have been very pleasant."

THE Peoples Light and Power Company, of Barre, Vt., has changed hands, Boston capitalists being largely concerned in the new ownership.

THE proprietors of the Arlington (Mass.) Gas Light Company have instituted a new net rate, which puts the price on illuminating account at $1.65 per 1,000, and on fuel account at $1.30 per 1,000.

THE improvement on the city gas plant of Guelph, Can., which virtually amount to reconstruction, will be completed by July 1st. We are told that the new plant, which is of the combined coal-water gas type, is right up to date.

THE proprietors of the Cohoes (N. Y.) Company have reduced the selling rate to $1.37 per 1,000 cubic feet.

A CORRESPONDENT in Wheeling, W. Va., writing under recent date, says that the annual report of the Gas Trustees for the fiscal year concerning the operation of the city gas works shows that the "Decrepit old plant when relieved of the expenses of maintaining the city electric plant shows a profit of $22,352.03, notwithstanding that there was an

expenditure of approximately $7,000 for renewing portions of the works."

Mr. L. A. LEWIS, writing from Pittsburgh, Pa., of May 14th, incloses the following: "Judge J. A. Evans, of Common Pleas Court No. 3, filed an opinion a few days ago which decides an interesting question affecting the rights of corporations holding franchises from the city as against the authority of the city to use the street for public commodities, such as the supplying of water. The opinion is written in the suit of the City of Pittsburgh against the Consolidated Gas Company, to restrain the Company from interfering with the removal of its gas pipes in Ellsworth avenue. The city is engaging in improving its water supply by the erection of a filtration plant, and in the course of this improvement it was laying a water main in Ellsworth avenue where it became necessary to remove the pipes of the Gas Company. Judge Evans says: 'The duty to furnish the supply of water to the inhabitants of the city of Pittsburgh and for public use is such a public duty as gives it the paramount right to occupy the streets over the rights of any private corporation, and the rights of the defendant are subordinate and must give way whenever they conflict with the rights of the city to construct its water mains. The defendant, the Consolidated Gas Company, must pay the costs of removal and replacing of its pipes and the costs of this proceeding. It is conceded by the counsel for the defendant that if the removal of its pipes were occasioned by the change of the grade of the street, or the construction of a sewer, the defendant Company would be compelled to change the location of its pipes wherever their present location interfered with the city in the prosecution of its work. But it is claimed that the furnishing of water and the laying of pipes incidental thereto is not a governmental function and that the city, in doing the same, is acting as a private corporation. It may be conceded that the furnishing of water to the inhabitants of the city and for the use of the public is not an inherent right or duty on the part of the city; but when the Legislature imposes that duty upon the municipality, as it has done in the case of the city of Pittsburgh, it becomes as binding a duty upon the city to furnish healthful water to its inhabitants and a supply of water for public uses, as though it were an essential to the conduct of municipal government. Certainly, the supplying of clean water and healthful water is as necessary to public life as is the taking care of the sewage of the inhabitants of the city, and the Legislature has devolved upon the municipality of Pittsburgh the duty of conserving the public health by the proper supply of water to its inhabitants."

MR. FRANK D. MOSES says that the plant of the Calumet Gas Company will be in operation October 1st. He is to supervise its construction, and he is usually well within knowing what he is talking about.

WORK on the new gas plant for Bellows Falls, Vt., which was to have been commenced this month, has been postponed until August.

MR. JAMES W. LANE has resigned from the service of the Atlantic City (N. J.) Gas and Water Company.

A SHORT despatch from San Francisco, Cal., dated May 6th, says: "The San Francisco Gas and Electric Company has repaired its plants at the two Potrero stations and at the Martin station south of the Six Mile House, and is now ready, its managers announce, to turn the gas into the mains of the city whenever the authorities say the word. The United States Mint and the general post office are to be supplied with gas at once, as the mains supplying them have been overhauled and repaired. The burned district generally will not be supplied with gas, however, until some time later."

AT the annual meeting of the Detroit City Gas Company, Mr. E. G. Pratt was formally elected Second Vice-President and General Manager vice Mr. A. P. Lathrop. The other officers chosen were: President, Emerson McMillin; First Vice-President, Dexter M. Fury; Secretary, Chas. S. Ritter; Treasurer, M. W. O'Brien; Assistant Treasurer, George E. Lawson.

"AT the annual meeting of the stockholders of the Cincinnati Gas and Electric Company these directors were re-elected: S. B. Burton, J. T. Carew, B. S. Cunningham, J. B. Foraker, Jr., R. A. Holden, A. H. Hinkle, Norman J. Kenan, M. E. Moch, William Cooper Procter, James G. Schmidlapp, W. S. Rowe, Casper H. Rowe, Charles P. Taft, M. M. White and Casimir L. Werk. Theodore Clauss was elected Secretary, Treasurer and Auditor, the three positions having been merged. The stockholders gave a vote of thanks to the Directors for effecting the lease of the property. Reports as to the amount of gas manufactured by the Company, giving details of the business, were made. During the past year 2,170,000,000 cubic feet of gas were manufactured, an increase of $250,000,000 over the year previous.—R."

MR. CHARLES F. THOMPSON, for 12 years Treasurer of the Brattleboro (Vt.) Gas Company died at his home in that city the afternoon of the 11th inst. He was born in Seymour, Conn., in 1830, but in early youth settled in Brattleboro, where he amassed a fortune.

AT the annual meeting of the Springfield (Mo.) Gas Company the only change made in the management was the substitution of Mr. W. A. Bixby for Mr. Philip A. Bertrand as Manager. It was merely a perfunctory change, since Mr. Bixby has been in actual charge at Springfield for some time.

THE New York *Commercial* says that at the annual meeting of the stockholders of the United Gas Improvement Company, of Philadelphia, it was decided to increase the capital stock from 734,500 to 918,005 shares. Par value of old and new shares is $50, and the new stock will be sold at this figure to shareholders in the proportion of 25 per cent. of their holdings of record as of May 12. The right to subscribe expires on June 15. Net earnings of the corporation for the year ended Dec. 31 last were $5,070,165, as compared with $4,470,843 in 1904, and $4,027,529 in 1903. The net profits equal 13.8 per cent. on nearly $36,750,000 stock outstanding, and mark the highest record figure in the history of the Company.

A Municipal Commission for New Jersey.

Presented for consideration to the New Jersey Legislature, January 29, is put forth an effort to remedy the inconsistencies in municipal laws caused by a multiplicity of new statutes year after year. The bill provides:

Whereas, Municipal government is that form of government which most directly affects the people and therefore should be so economically and efficiently administered as to bear as lightly as possible upon them; and,

Whereas, Under the present provisions of the Constitution of this State a mass of municipal legislation is enacted at each session of the Legislature, which, though general in form, is special in application (thus evading the constitutional provision against special legislation), and thereby encumbering the statute books besides causing confusion and difficulty for municipalities not intended to be affected; and,

Whereas, Such legislation is frequently unconstitutional and a large part of the time and energy of the courts is spent in its construction and application; and,

Whereas, The principle of local self-government is recognized to be fundamental and essential to the welfare of the people; therefore,

Be it resolved by the Senate and General Assembly of New Jersey:

1. The Governor is hereby authorized and requested to appoint three persons as commissioners, who shall consider and report to the Governor, and to the Legislature on the 1st day of its next session, upon the whole system of municipal government in this State, relating to cities, towns, boroughs, villages, counties and townships.

2. Such report shall include the following:

A. The functions and powers of said municipalities in their relations to the State, to the citizen and to each other, respectively, and how far such functions and powers should extend.

B. How far and in what respects, if any, such municipalities, or any of them, may, with safety, be relieved from legislative control, in order to promote the principle of local self government.

C. What, if any, general restrictions should be placed upon the powers and functions of such municipalities, or any of them, with respect to taxation, the issuance of bonds or other municipal obligations, and the creation of municipal indebtedness in general.

D. What, if any, constitutional changes are necessary or advisable with relation to municipalities in order to restrict or to safely enlarge their powers and functions.

3. They shall report such bill or bills as they may deem advisable for any or all of said purposes, having in view the curtailment of municipal legislation, the production of greater certainty in municipal law and efficiency in municipal government, and the decrease of taxation and of municipal burdens in general.

4. The necessary expenses of the commission, when approved by the Governor, shall be paid by the Treasurer of this Stete, out of the treasury of the State, on the warrant of the Comptroller.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—A. Siegel, 30 Lime Street, London.

MONDAY, MAY 21, 1906.

The Market for Gas Securities.

There was a further recovery in quotations for local gas shares last week. Consolidated closed to-day (Friday) at 138¾ to 139, and Brooklyn Union at 123 to 133, ex. dividend. Brooklyn Union 5's are quoted at 108 to 112, and we would like to know where there is a better bond purchase than that! Mutual, of New York, is quoted at 225 to 250, while its true value is 100 points higher.

Lacledes hold their own in good shape. The company has just declared their usual semi-annual dividend of 2½ per cent. on the preferred and the regular quarterly dividend of 1½ per cent. on the common, both payable the 15th prox. Peoples, of Chicago, is a shade off, and so is Consolidated, of Baltimore.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.
16 WALL STREET, NEW YORK CITY.

MAY 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	138¾	139
Central Union, Bonds, 5's	3,000,000	1,000	108	110
Equitable Bonds, 6's	1,000,000	1,000	..	105
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	225	250
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.—				
Bonds, 5's	11,000,000	1,000	100	102
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's	1,250,000	1,000	105	107
New York and East River				
Bonds 1st 5's	3,500,000	1,000	108	111
" 1st Con. 5's	1,500,000	..	104	110
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	123	133 x
" " Bonds (5's)	15 000,000	1,000	108	112
Bay State	50,000,000	50	5/16	¾
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000.000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	9	10
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,550,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	103½	103¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,683,750	100	..	95
Preferred	3,026,500	100	107½	108
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	..	8½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5 000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	107½	108½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100		105
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	6,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	92	92½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	58	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	100	.	..
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,600,000	20	302½	303¾
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	..

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Cruse-Kemper Co., Philadelphia, Pa 904
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Deily & Fowler, Philadelphia, Pa 920
Economical Gas Apparatus Construc'n Co., Toronto, Ont 897
Empire Gas Construction & Improvement Co., N. Y. City 905
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Fred. Bredel Co., Milwaukee, Wis 914
G. Shepard Page's Sons, New York City 915
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Isbell-Porter Company, New York City 918
Kerr Murray Mfg. Co., Fort Wayne, Ind 916
Lloyd Construction Co., Detroit, Mich 906
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R. D. Wood & Co., Philadelphia, Pa 918
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Kerr Murray Mfg. Co., Fort Wayne, Ind 916
Logan Iron Works, Brooklyn, N. Y 922
R. D. Wood & Co., Philadelphia, Pa 918
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The Gas Machinery Co., Cleveland, O..... 900
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(Continued on page 897.)

DIVIDEND NOTICE.

OFFICE OF THE AMERICAN GAS COMPANY,
222 S. THIRD ST., Philadelphia, Pa., May 16, 1906.

The Board of Directors of The American Gas Company has this day declared a semi-annual dividend of 3 per cent., or $3 per share, on the capital stock of the Company, payable on and after June 1, 1906, to stockholders of record on May 21, 1906, at 3 P.M. Transfer books close May 21 and re-open June 2, 1906. Checks will be mailed.

1615-1 WALTER GODLEY, Treasurer.

PROPOSALS FOR FURNISHING INCANDESCENT GAS LIGHTING EQUIPMENT.

The Board of Directors of the Street and Sewer Department will receive sealed proposals at their office, S. W. corner Sixth and King streets, until 11 o'clock, Tuesday morning, May 29, 1906, for furnishing 635 or more incandescent gas lamps complete, of a pattern suitable for street lighting, of at least sixty (60) candle power, including frames, domes, globes, burners, mantles or other necessary devices. Copies of instructions, specifications and proposal blanks may be obtained at the offices of the Department. The right to reject any and all bids or to accept any portion of a bid is reserved.

1615-1 Attest: L. V. CHRISTY, Secretary.

NOTICE!

PLEASE read the advertisement of the Empire Gas Improvement and Construction Company, on page 901. This Company employs only high-priced and quick-working mechanics, and all its work is guaranteed to be strictly first class, and will be finished at time specified. A. M. SUTHERLAND,

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(*Concluded from page* 896.)

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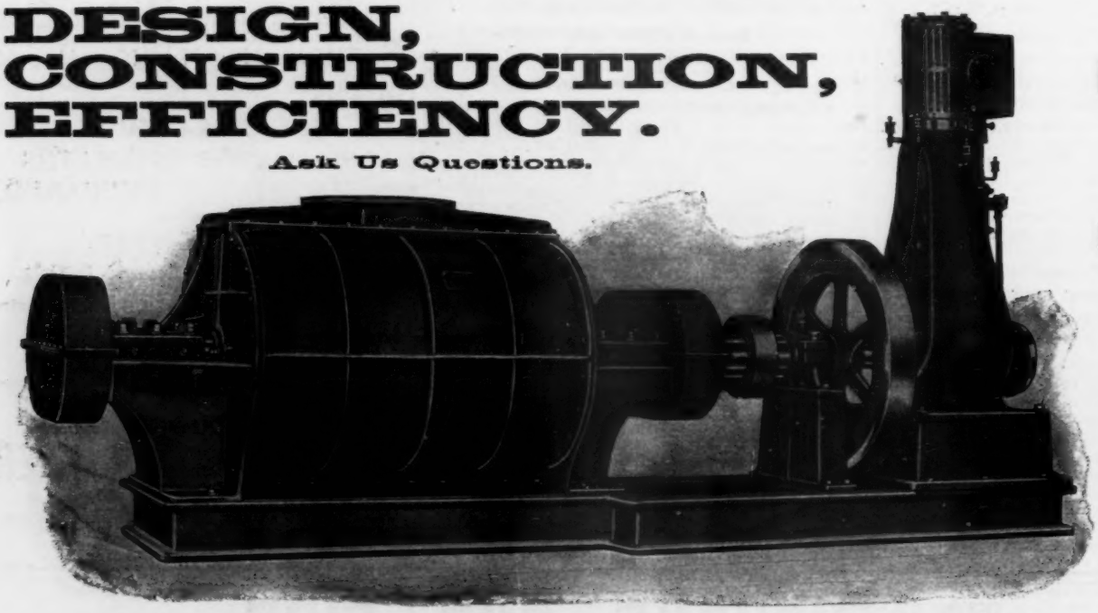

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Cleckheaton Gas Co	30,000	General Works Meter.
Cleethorpes Gas Co	25,000	Water Gas Make.
Croyden Commercial Gas and Coke Co	3,500	Oxide Revivification.
" " " "	80,000	Carburetted Water Gas.
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Gas Light and Coke Co., London	5,000	Oxide Revivification.
" " "	3,500	" "
" " "	3,500	" "
Gas Anstalt, Hanover, Germany	100,000	General Works Meter.
Halifax Corporation	100,000	Ca buretted Water Gas.
Hastings and St. Leonards Gas Co	100,000	General Works Meter.
Hanover Gas Works, Hanover, Germany	100,000	" " "
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We have been permitted by the recipients, an American constructing concern, to reproduce the following letters recently received in reply to inquiry respecting Rotary Station Meters made of three important English gas works' engineers, all of whom enjoy enviable reputations and are everywhere among their fellow workers recognized for the skill, ability and success which has attended their administrations of the properties with which they are connected. The originals of these letters, together with many more of similar tenor, are on file in our office and open to the inspection of any prospective purchaser of Rotary Station Meters.

DEAR SIRS:

In answer to yours of the 27th March, I have pleasure in stating that we have had an 80,000 cu. ft. per hour Rotary Station Meter in use in connection with our Water Gas Plant for almost 18 months; during the greater part of this time we worked in series with our ordinary station meter, and found its registration accurate. I am so satisfied with it that I am about to place an order with the firm for a meter to pass 180,000 cu. ft. per hour of coal gas.

Yours faithfully, _____

DEAR SIRS:

In reply to your enquiry of the 27th March *re* Rotary Meter, I have not the slightest hesitation in stating that the meter we have in use here is giving every satisfaction.

It is 15,000 cu. ft. per hour and fixed at the outlet of Condensers of our Carburetted Water Gas Plant, and of course in the inlet of the Relief Holder, and is working under extreme conditions.

It is fixed underground, and since we have had it, *viz.*, 3 years, we have only taken it out once for examination (and this out of curiosity); as you will quite understand, there is a lot of oil, tar, etc., in contact with the meter at this point, and we thought it might be getting clogged up, but were pleased to find that such was not the case.

From our experience we have not the slightest hesitation in recommending its adoption to all gas makers.

I shall be pleased to reply further if necessary.

Yours very faithfully, _____

GENTLEMEN:

In reply to yours of March 27th respecting the Rotary Station Meter in use at these Works, I beg to inform you that the same has given every satisfaction. The meter has been registering the whole of the gas made at our Inclined Retort Section for the past 2½ years, and up to the present time we have not had the slightest trouble. The capacity of our meter is 100,000 cu. ft. per hour.

Yours truly, _____

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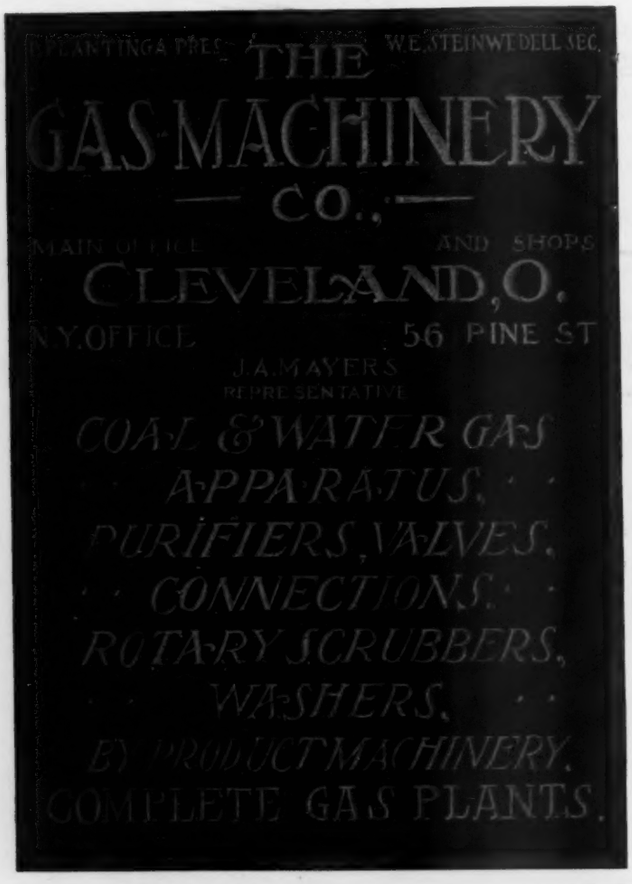

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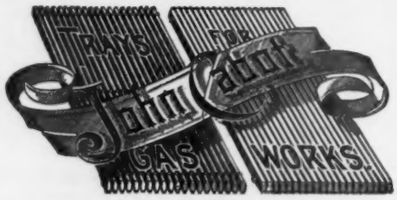

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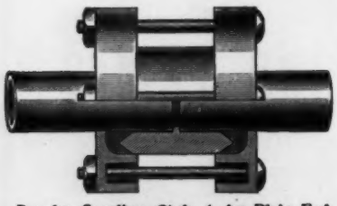
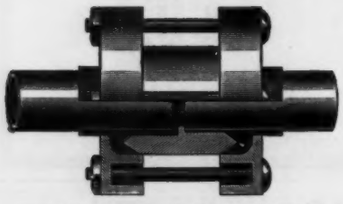
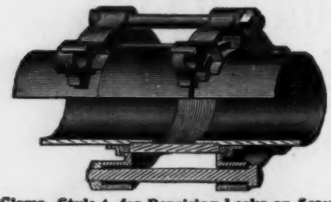


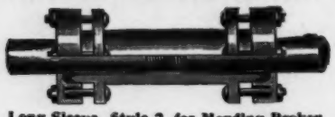
Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.



Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe,



Clamp, Style 4, for Repairing Leaks on Screw Collar.



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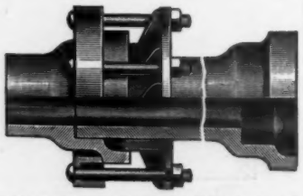
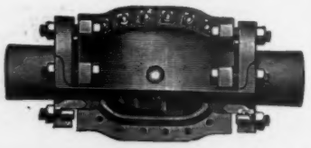
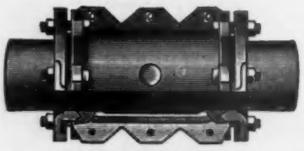


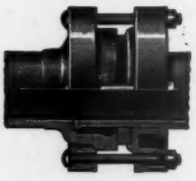
Coupling, Style 9, for Special Style Cast Iron Pipe.



Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.



Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.



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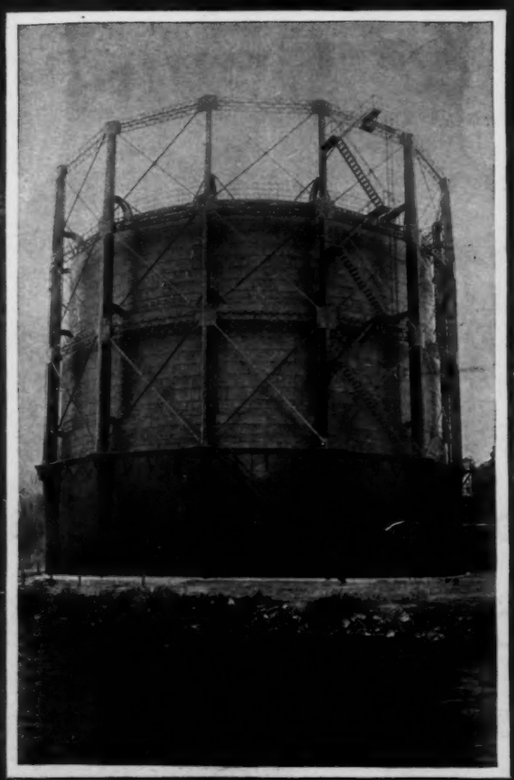

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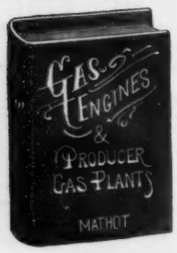

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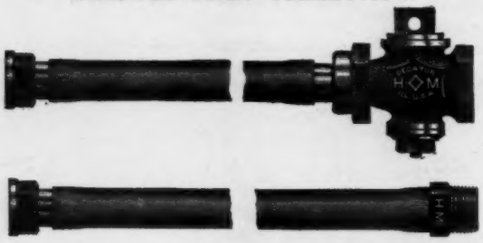

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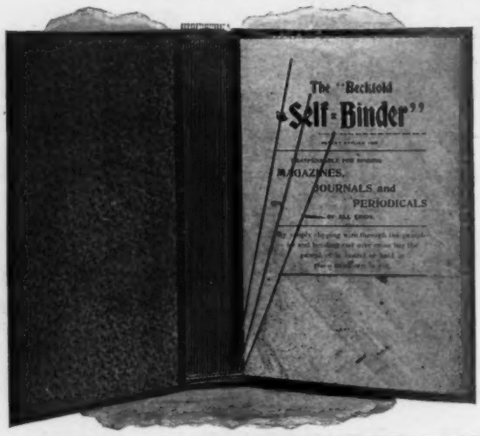

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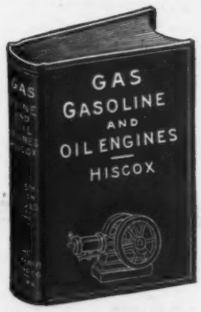

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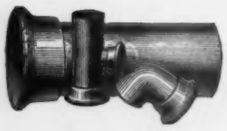

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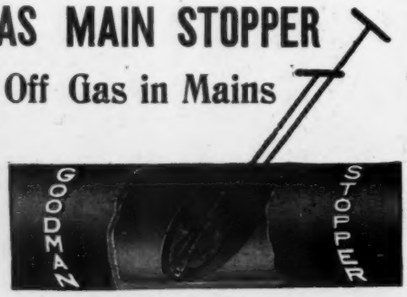
For Shutting Off Gas in Mains

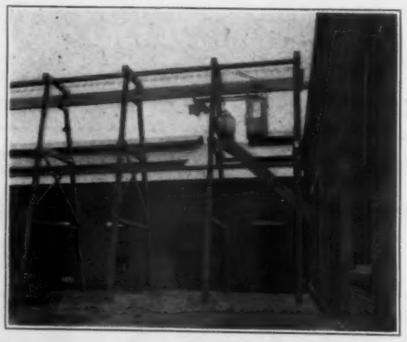
Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 552 E. 135th St., New York City.



Telpher Delivering a Load of Coke

into the boiler house of the Worcester Gas Light Company, Worcester, Mass. The boiler house is about 700 feet from storage, and the coke is transferred in about two-thirds of a minute.

All kinds of materials can be transported by Telpherage.

Write for Booklet 53.

UNITED TELPHERAGE DEPARTMENT

The Dodge Coal Storage Co.

Philadelphia—Hunting Park ave. and P. & R. Ry.
New York—49 Dey street.
Boston—164 Federal street.
Chicago—39th street and Stewart avenue.
Pittsburgh—1501-2 Park Building
Portland, Ore.—309 McKay Building.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

BELT CONVEYORS

EQUIPPED WITH

BALL BEARING ROLLS

ARE THE BEST,

because they possess greater efficiency, consume less power, and the belts last longer than when any other type of roll is employed.

PLANS AND ESTIMATES FURNISHED ON REQUEST.

The Link-Belt Machinery Co.
Link-Belt Engineering Co. Philadelphia Chicago. U.S.A.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

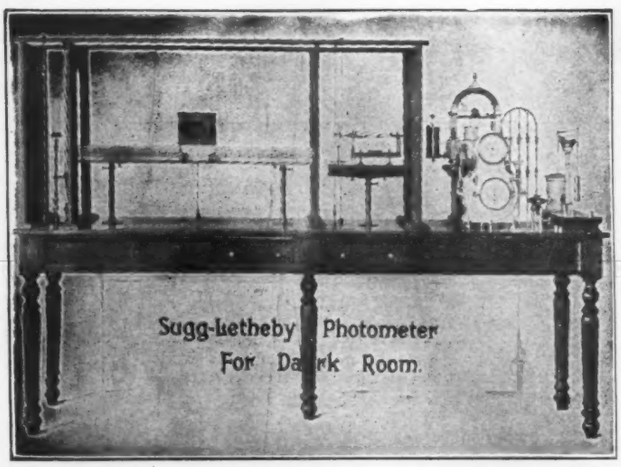
JUNE, 1906.

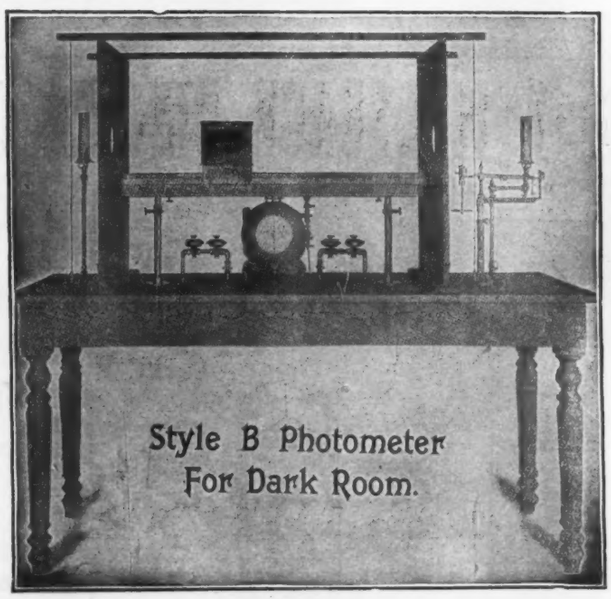
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Fri.	1	12.50 AM	3.30 AM
Sat.	2	1.30	3.30
Sun.	3	2.10	3.30
Mon.	4	2.50	3.30
Tue.	5	No L.	No L.
Wed.	6	No L. FM	No L.
Thu.	7	No L.	No L.
Fri.	8	8.00 PM	10.20 PM
Sat.	9	8.00	11.20
Sun.	10	8.00	12.00
Mon.	11	8.00	12.40 AM
Tue.	12	8.00	1.10
Wed.	13	8.00 LQ	1.40
Thu.	14	8.00	2.10
Fri.	15	8.00	2.40
Sat.	16	8.00	3.10
Sun.	17	8.00	3.30
Mon.	18	8.00	3.30
Tue.	19	8.00	3.30
Wed.	20	8.00	3.30
Thu.	21	8.00 NM	3.30
Fri.	22	8.00	3.30
Sat.	23	8.00	3.30
Sun.	24	8.00	3.30
Mon.	25	8.00	3.30
Tue.	26	9.50	3.30
Wed.	27	10.20	3.30
Thu.	28	11.00	3.30
Fri.	29	11.30 FQ	3.30
Sat.	30	12.00	3.30

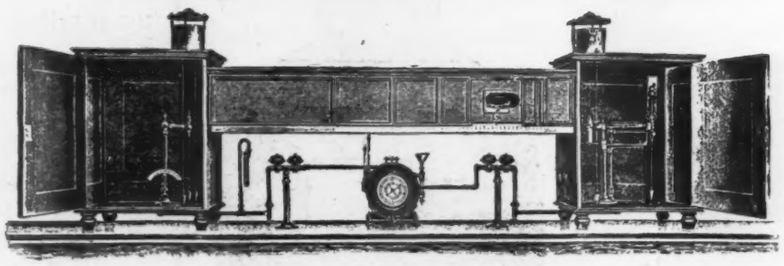
TOTAL HOURS DURING 1906.

By Table No. 1.

	Hrs.Min.
January	223.40
February	190.40
March	192.10
April	167.00
May	152.20
June	142.10
July	150.20
August	157.40
September	170.00
October	185.10
November	201.40
December	214.00
Total, yr.	2146.50







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

JUNE, 1906.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. All Night Lighting. Light	Extinguish.
		P. M.	A. M.
Fri.	1	7.15	3.15
Sat.	2	7.15	3.15
Sun.	3	7.15	3.15
Mon.	4	7.25	3.15
Tue.	5	7.25	3.15
Wed.	6	7.25	3.15
Thu.	7	7.25	3.15
Fri.	8	7.25	3.15
Sat.	9	7.25	3.15
Sun.	10	7.25	3.15
Mon.	11	7.25	3.15
Tue.	12	7.25	3.15
Wed.	13	7.25	3.15
Thu.	14	7.25	3.15
Fri.	15	7.25	3.15
Sat.	16	7.25	3.15
Sun.	17	7.25	3.15
Mon.	18	7.30	3.15
Tue.	19	7.30	3.15
Wed.	20	7.30	3.15
Thu.	21	7.30	3.15
Fri.	22	7.30	3.15
Sat.	23	7.30	3.15
Sun.	24	7.30	3.15
Mon.	25	7.30	3.15
Tue.	26	7.30	3.15
Wed.	27	7.30	3.15
Thu.	28	7.30	3.15
Fri.	29	7.30	3.15
Sat.	30	7.30	3.15

TOTAL HOURS DURING 1906.

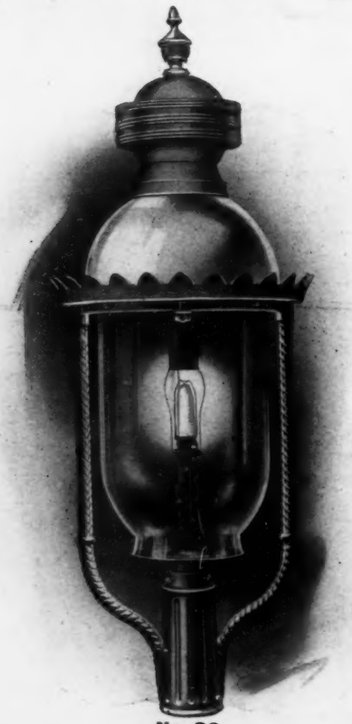
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting.**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

THE NEW NO. 7 WELSBACH DINING ROOM FIXTURE.

PRICE, EACH, COMPLETE, WITH SHADE, FRINGE, MANTLE AND CHIMNEY, $14. PER DOZ., $150. DISCOUNT, 50 PER CT.

Standard Length, 30 inches.
The New No. 7 Welsbach Dining Room Fixture, when ordered, will be sent complete, as follows:

1 No. 7 Harp Fixture and Brass Crown finished in Brushed Brass.
1 No. 66 Welsbach Burner (high candle power).
1 No. 4 Pilot By-pass.
1 No. 4197 Mantle — Intensive Brand.
1 No. 306 Chimney (air hole).
1 Fourteen-inch GREEN Art Glass Shade, with six-inch Green Beaded Fringe.

This fixture is being largely used by Gas Companies as a dining room fixture at the popular retail price of $10 complete, and is a great favorite for moderate sized two and three-story residences. In popularity and price it is unequalled.

VARIATIONS.

Finished in oxidized copper, oxidized brass, etc., 25 cents extra.

Shades in Ruby and Green--Ruby, Amber and other colors, without extra charge.

Special colors require a few days extra time to fill orders.

Green Shades will be shipped unless otherwise ordered.

WELSBACH CO.,
Salesrooms in All the Principal Cities of the United States.
Factories:
GLOUCESTER, N. J.
CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31st, 1905, has been Awarded Contracts for 40 Sets of

Standard Double-Superheater Lowe Water Gas Apparatus.

PARTIAL LIST OF PLACES:

Catasauqua, Pa.
Plattsmouth, Neb.
Detroit, Mich. (2d contract).
Springfield, Ills.
Oneonta, N. Y. (2d contract).
Pottsville, Pa. (2d contract).
Evansville, Ind. (2d contract).
Lansdale, Pa.
Hempstead, N. Y. (2d contract).
New Britain, Conn.
New York, Mutual Co. (3d contract)
St. Louis, Mo. (4th contract).
Sioux City, Ia. (3d contract).
Amsterdam, N. Y.
Houston, Tex. (2d contract).
Hamilton, O. (2d contract).
Indianapolis, Ind. (2d contract).
Nanticoke, Pa.
Hazleton, Pa.
Mahanoy City, Pa.
Ludington, Mich.
Ossining, N. Y.
Lancaster, Pa.
Flushing, N. Y. (2d contract).
South Bend, Ind.
Fall River, Mass. (2d contract).
Minneapolis, Minn. (2d contract).

TOTAL SETS TO DECEMBER 31, 1905, ... 593
TOTAL DAILY CAPACITY TO DECEMBER 31, 1905, 463,780,000 CU. FT.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

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CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
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ST. LOUIS GAS CONSTRUCTION CO.,

DESIGNERS AND BUILDERS OF

COAL GAS BENCHES,

SPECIAL HIGH GRADE REFRACTORY MATERIAL FOR BENCH SETTINGS AND WATER GAS LININGS.

SOLE AGENTS FOR

CHRISTY SETTINGS.

CORRESPONDENCE SOLICITED.

ST. LOUIS, MO.

STANLEY'S CELEBRATED FIRE CEMENT

For the Repair of Clay and Iron Retorts & Firebrick Work, for the Protection of Ironwork when Exposed to a High Degree of Heat, and Excellent for Mouthpiece Joints.

In General Use in the United States and Canada.

Unlike Expensive Preparations,
THERE IS ABSOLUTELY NO WASTE.

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Established 1846.

Adam Weber Sons.

Manhattan Fire Brick and Enameled Fire Clay Retort Works.

Works at Weber, on the Raritan River. Middlesex County, New Jersey.

GENERAL OFFICES:
Park Row Building, New York City.

Modern Coal Gas Benches,

With either Horizontal or Inclined Retorts, Half-Depth and Full-Depth Recuperative Furnaces.

ADAM WEBER PATENTS

STANDARD BENCH IRONWORK.

Linings for Water Gas Apparatus, High Grade Fire Brick of All Shapes and Sizes, Ground Fire Clay, Ground Fire Brick in Bulk or in Barrels.

ISAAC C. BAXTER, President.
Works,
LOCKPORT STATION, PA.

ESTABLISHED 1864.

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PETER YOUNG, Secretary and Treas.
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Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. PITTSBURGH, PA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 300 " " 6 " "
In Kegs less than 100 " " 7 " "

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BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

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Agents for New England States.

LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

JOHN DELL,
President and General Manager.

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ESTABLISHED 1882.

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Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the Exclusive Agents *for the* Mitchell Patent Benches, *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* Rear Clinkering. The Mitchell *is the* Original Coal Firing Bench. *We also Erect Plain Benches with* One to Six Retorts.

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

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Bronder Patent Stoking Machinery.

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These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

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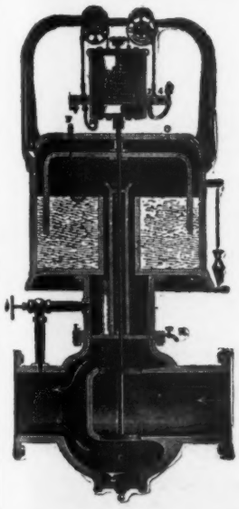

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COAL OR WATER GAS PLANTS,

Automatic, Balance, High Pressure and Service Governors,

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material for Gas Purification, Jones Jet Photometers, Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM.

Reinforced Concrete Construction for all Purposes.

Wide Experience in High Pressure Installation and Extension,

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WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

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SLOPERS.—We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

We Build Benches Complete. Ready for Gas Making. Also,

RETORT HOUSES,

COAL and COKE CONVEYING MACHINERY.

Plans, Specifications and Estimates Cheerfully Furnished.

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ALL CONTRACTS MADE AS OF ST. LOUIS, MO.

Gold Medals awarded by the Louisiana Purchase Exposition at St. Louis, for fireclay gas retorts, gas retort benches, firebrick and setting tiles.

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Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

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STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
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Special High Grade Material for Recuperative Furnaces.

Licensees for ARROLL-FOULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST. MILWAUKEE, WIS.

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Strong, Simple, Durable. Will Crush any Size Desired.

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PRODUCER, REFINER, SHIPPER AND EXPORTER OF Petroleum and All Its Products.

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THE SUN OIL CO.

Gas Oil, Gas Naphtha,
Refined Oil, Lubricating Oils.

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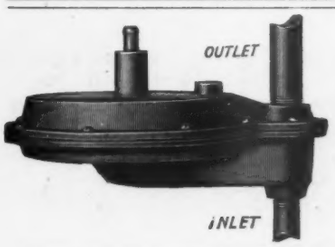

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Our Governors Reduce 30 or 40 Pounds Pressure to 2 Inches Water Pressure.

WE MAKE ALL SIZES OF

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Write for Catalogue and State what you Need.

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PRACTICAL HANDBOOK ON

GAS ENGINES,

With Instructions for Care and Working of the Same,

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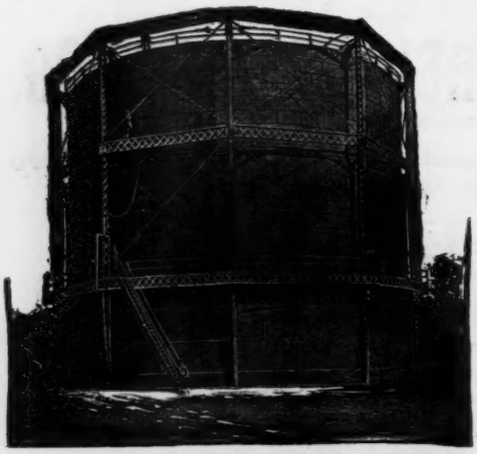

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Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

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SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE.

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APPARATUS FOR COAL GAS PLANTS,

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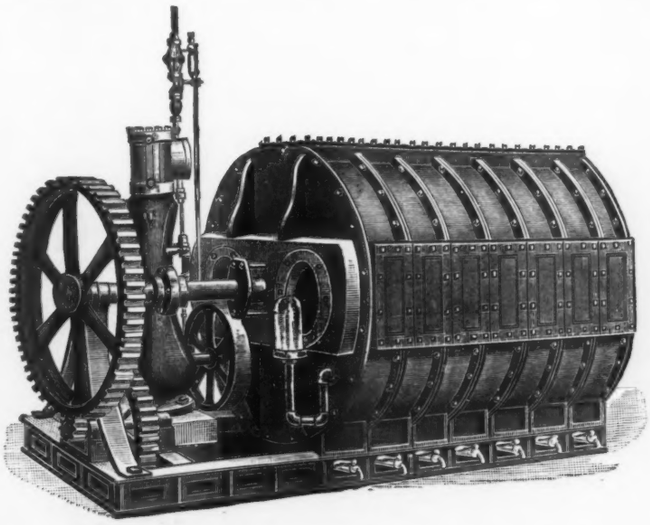

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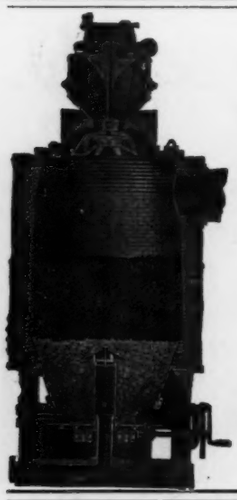

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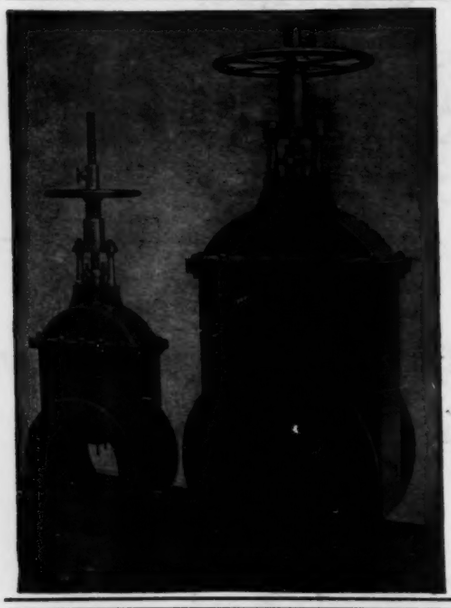

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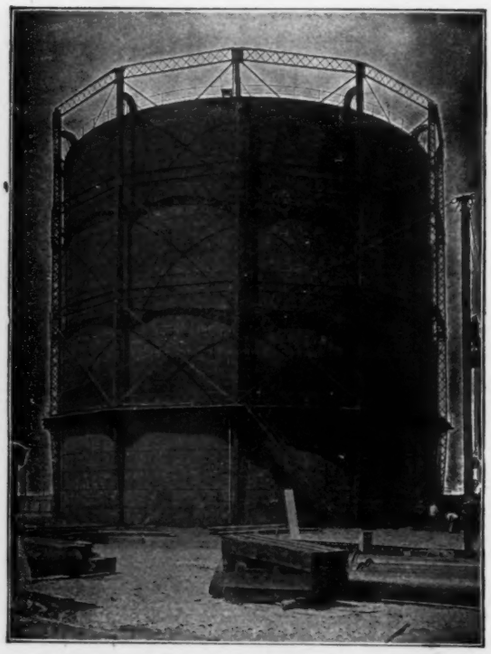

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—OF THE—

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MR. E. H. YORKE, NEW HAVEN, CONN., Dec. 1, 1898.

Dear Sir: I am in receipt of a copy of "Excerpts from the Decisions of the Board of Gas Commissioners," which is a handy compilation in book form of extracts from the most recent decisions of the Gas Commission of Massachusetts.

I note that most of these extracts are broad and safe-guiding precepts, which apply with equal force to one Company as to another. The 13 years' existence of the Board of Gas Commissioners, with its unusual opportunities for acquiring information, have justly made it a high and safe authority in all matters pertaining to the management. obligations and rights of Gas Companies. Your little book will serve as a valuable reference library in settling legal complications which often arise between a Gas Company and its customers.

Yours truly, (Signed) F. C. SHERMAN, Superintendent.

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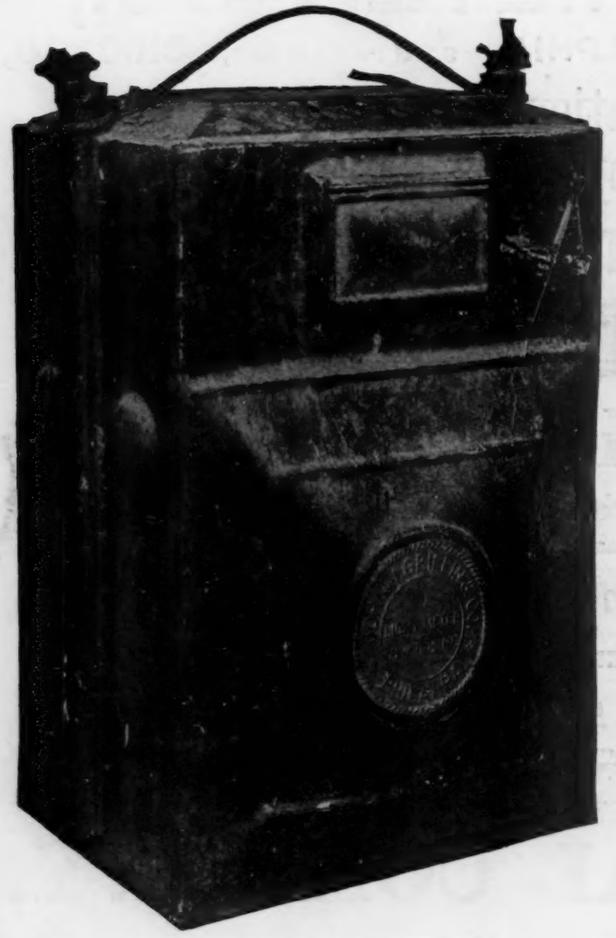

This is a photograph of a 3-light regular meter out of a lot of meters received from the Coatesville Gas Co., Coatesville, Pa., to be repaired and converted into prepayment meters.

AFTER.

This is the same meter after it has been repaired and converted into a new prepayment meter.

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